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No. 8

Original Articles

FRAGILITAS OSSIIUM WITH REPORT OF THREE CASES.

FRANK L. ROSE, M.D.
JACKSON, MICH.

Fragilitas ossium may be defined as a disease or a defect characterized by abnormal brittleness of the bones with a tendency to fracture on very slight provocation. It was first described in 1838, by Lobdell, who named it osteopsathyrosis, the Greek equivalent of fragilitas ossium. It is also known as Lobdell's disease. Though the term is often used to denote brittleness of bone from any cause as e. g. old age, tumors in or adjacent to bone, syphilis, osteomalacia, etc., it is not so used here, but as the name for a distinct pathological entity, and is so used by most writers. It may be grouped with rickets, osteomalacia and osteogenesis imperfecta since all are characterized by a disproportion between the animal and mineral constituents of osseous tissue, but clinically as well as pathologically it differs from all the others of the group; from rickets in the fact that bones break and do not bend, so that the resulting deformity of fragilitas ossium, if any, have nothing in common with those of rickets, i. e. no cranio-tabes, no bow-legs, and no spinal or pelvic distortions. Nor do these children show other associated signs and symptoms which so frequently accompany rickets.

Osteomalacia, a process of absorption of normal mineral matter of bone, is almost wholly a disease of adult life in women, occurring almost exclusively during gestation. It may be said to be practically unknown in this country. Between osteogenesis imperfecta and fragilitas ossium, however, the line is less clearly drawn, and many authors seem to consider these terms synonymous. However, in osteogenesis imperfecta the fractures occur in utero, the bones are extremely small and very rarely, it is said, does the child reach second year of life. The

two conditions seem of equal and extreme rarity, there being but 130 cases of genesis imperfecta on record according to Keen, while about the same figures would seem to hold for fragilitas ossium.

The three cases which I am now reporting are all in children of the same family, and have all been at various times under my observation and care as the fractures occurred and until firm union was in each case secured. I have represented these cases with others of which I have a history only by the accompanying chart which requires brief explanation. The perpendicular are ancestral lines or lines of descent. The horizontal are family lines, i. e. showing brothers and sisters of the same family. The squares represent male, the circles female, the shaded those who have shown evidence of osteopsathyrosis, the white those free from it, the figures in parenthesis showing the number of fractures sustained, while the figures not enclosed are for convenience of reference only.

The Fuller family of Jackson, Michigan, consists at present of:

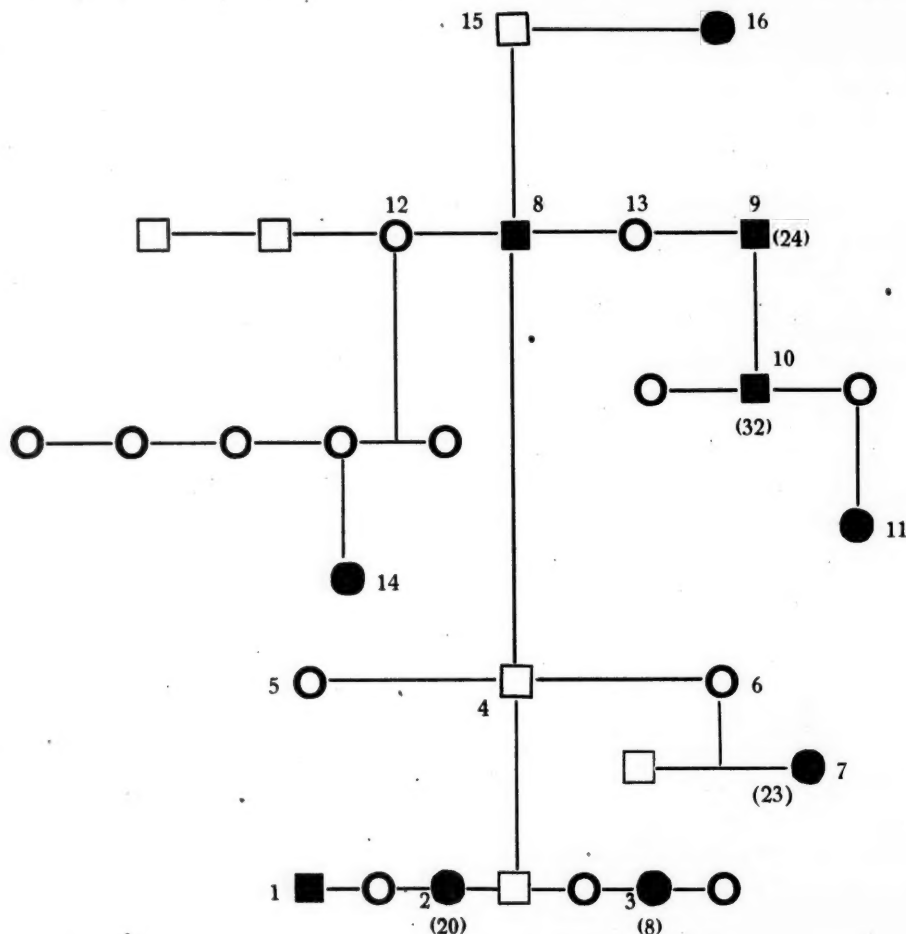
(a) George Fuller, No. 4 on chart, aged 51, laborer, of good health and physique. He has sustained two fractures in his lifetime, one of the clavicle and one of the left femur, but as according to his report both were the result of violence sufficient to fracture normal bone, I have not included them.

(b) The mother, not represented on chart, has given birth to eight children, seven living, one still-born from abruptio placentae last winter. She has had no abortions, nor is there any record of broken bones in her family. This brings us to the three children whose cases I am now reporting.

(c) Jay, No. 1 aged 18, male, of good physique, somewhat below normal height and weight, has suffered thirteen fractures, only one of which, namely, the last, occurred under my observation. A fracture of left radius and ulna healed without deformity or loss of function. The fractures preceding these have been of the thigh, humerus, clavicle, tibia and fibula, and only one has resulted unfavorably, namely, that of the lower end of the right humerus, in which deformity of the elbow resulted, although with perfect function. His first fracture occurred at 1 year, and the last at 15 years of age.

(d) Alice aged 15, No. 2 on chart, has had about eighteen or twenty fractures. The first, of the left femur, discovered nine days after birth, whether present at or before birth is not known, and the last two, of the right tibia and fibula simultaneously at 14. Her second fracture was of the right femur at 2 years of age, and no further fractures occurred until the age of 10, since which she sustained the remainder of the eighteen or twenty fractures which occurred at irregular intervals and from trivial causes. At one time, since I have been treating her, she broke both bones of both legs while walking along a cement sidewalk. All her fractures that have come under my observation since she was 11 have been of the legs about six inches below the knee, except one in

a few fractures, and one of his brothers, No. 9, had twenty-four, and of this man's children one son, No. 10, had thirty-two, the last one at about 30 years of age, while a grand daughter, No. 11, had several, but the exact number is not known. Of the two sisters, Nos. 12 and 13, neither had fractures, one never married; the other married and bore five healthy daughters, but the disease reappeared in the next generation in No. 14. The paternal grandfather, No. 15, was free from the disease, but a sister, No. 16, was said to have sustained so many that she became dwarfed and distorted and traveled as a human curiosity with a circus. However, it seems she married, but whether she left descendants or not my informant did not know. I may add that according to Mr. Fuller



which in addition to the leg bones, she broke the right olecranon in falling.

(e) Lois, aged 7, No. 3, has had eight fractures, the first two at six months, and these have also been mainly of the legs from slight falls. None of the other children have ever broken any bones, but are normal, healthy children, as are the afflicted ones also except for their tendency to fractures.

The two sisters of George Fuller, Nos. 5 and 6, have been wholly free from the disease, but the daughter of one of them, No. 7, aged 20, has had twenty-three fractures, none of which have occurred during the past two years. One of these fractures resulted, I understand, in a false joint in the femur.

The father of George Fuller, No. 8 on chart, had

multiple fractures have been a family trait for more than 100 years.

These fractures possess no special features of surgical interest, unique and remarkable though they are when viewed as phenomena of heredity or of perverted metabolism. The X-ray when employed as it was under most of those under my care showed the fractures to be invariably transverse, therefore adjustment and retention were easy, and for the same reason the fractures were relatively painless though by no means absolutely so. However, they showed a marked tendency toward angular

deformity, which in one case necessitated refracture with decided improvement, but not complete restoration or normal contour of the limb. All writers agree that most of the victims of fragilitas ossium grow up with more or less deformity from faulty union, and it must be remembered that in case of fracture of the lower limbs, they lose much time from school.

No one can be confronted with these deplorable accidents thus occurring in such great succession, nor contemplate the fell course of this unique and sinister disease through generation after generation without a lively desire to learn something of the cause and its pathology, and, if possible, of its treatment. If he turns to the literature of the disease, however, he will find it most meager and disappointing. The most complete discussion I have found is in Osler's *Modern Medicine*, first edition, in Emerson's article on fragilitus ossium. Warthin's discussion in the *Reference Hand Book of Medical Science*, third edition, is brief but more satisfactory than most others since he devotes some space to a discussion of its pathology and quotes one author, who explains the disease as due to deficiency of internal secretion. Reports in periodic literature consist mainly of details and in only one that I have seen has any scientific study of any particular case been undertaken. In this case described by Bookman of New York and reported in *Archives of Internal Medicine*, volume 8, page 675, the metabolism in a case of multiple fractures was carefully studied. In this case it was found that calcium was excreted in large amounts through the urine. The significance of this fact, as I view it, will presently appear.

No one, so far as I know, has suggested the thymus as a possible factor, and in mentioning it as such I should like to have it regarded as a suggestion merely and nothing else. The functions of the gland, not being yet fully enough understood to enable one to make positive assertion. It would seem to be fairly well established, although not undisputed, that the thymus exerts a regulative action on the supply of lime salts to growing bone, thymectomy in growing animals and in at least one reported case in a two-year-old child having been followed by softening and bending of the bones and the usual phenomena of rickets. These symptoms when occurring in thymectomized animals are promptly removed by reimplantation of the gland. That phosphorus is the element thus withheld is shown by the fact that

calcium is excreted in unusual amounts which of course must mean that the calcium which normally should combine to form calcium phosphate is compelled by the absence of phosphorous to form other and soluble compounds and so be excreted. Further study of the physiology of the gland which Sajous claims is a prime source of phosphorized compounds is necessary to show whether the hypothesis I have ventured to suggest has any value or not.

DISCUSSION.

DR. HAASS: A metabolic study of such a disease is very inaccurate because of the difficulty of measuring the exact intake and output of Calcium. In a case under observation there was a constant calcium deficit and it was not influenced by feeding glands having an internal secretion. However, feeding calcium does have some beneficial effect.

THE THYROID GLAND WITH SPECIAL REFERENCE TO GOITER.

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In order to properly understand the pathology one should become familiar with present knowledge of the anatomy and physiology of the thyroid gland and its relation to the metabolism of the human body. The anatomy in gross is well known, but since the discovery of the para-thyroid glands—the external by Sandstrom in 1880—the two internal by Nicolas, of Nancy, in 1893—it is customary to speak of the combined structures as the thyro-parathyroid apparatus.

The development of the thyroid gland takes place, instead of from three anlagen as was formerly supposed, from the median one originating near the base of the tongue and descending later to rest over the trachea. Anomalies result from failure of the gland to develop, by continuing its fetal form, and by its failure to leave its original location (sublingual thyroid), also by portions breaking off in its descent, thus accounting for accessory or aberrant thyroids.

THE FUNCTION OF THE THYROPARATHYROID APPARATUS.

While much has been learned during the last few years concerning these structures, especially with reference to the results of extirpation, either partial or complete, as well as the developments taking place after the administra-

tion of excessive amounts of thyroid gland structure, or the transplantation of thyroids, the entire function of these organs has not been positively determined. It is sufficient to state briefly, in this connection, that the removal of the entire thyro-parathyroid apparatus results in the production of highly nervous phenomena and finally death. On the other hand, in cases where the thyroid gland tissue has been ingested in excessive quantity, the subject presents a peculiar and characteristic train of symptoms similar to those observed in Graves' or Basedow's disease.

Considerable study has been given this subject and many theories have been propounded to explain the manner in which the thyroid carries on its functions, all finally giving way to the view that the organ secretes some substance which finds its way into the blood (Sajous). This was suggested a century ago by the experimental work of King, of London, who found that the colloid substance of the gland passed into the lymphatics. Schiff and others have grafted the gland in abnormal parts of the normal body, and this tends to show that it is a secreting organ. After a time a nest of typical thyroid tissue develops capable of carrying on the function of the gland. Again, extract of the gland, the gland itself in its raw state or dried, when administered after thyroidectomy counteracts the morbid effects of total extirpation. Based upon these findings Murray introduced the use of thyroid extract in myxedema.

The exact nature of the internal secretion of the thyroid can not be positively stated, although Sajous agrees with Oswald in the opinion that the thyroid product is an "iodized globulin," the globulin being the albuminous constituent of hemoglobin, i. e., adrenoxidase. Some observers contend that the product is a ferment and suggest its identity with the active principle of the adrenal. It is quite generally admitted that iodine is an important constituent of the thyroid secretion. Beebe states that "the physiologically active portion of the gland secretion is a protein substance containing iodine in a specific combination." Sajous says that "inasmuch as its activity in this organic combination greatly exceeds that of iodine or its salts, a property which its combination with a ferment (adrenoxidase) explains, its true identity is more accurately expressed by the term thyriodase." He claims that the purpose of this combination is primarily to insure the absorption of the iodine by the red

corpuscles, these cells being the normal host of the hemoglobin.

The secretion of the thyroid reaches the blood either by way of the lymphatics, as claimed by some, or, according to others, enters directly into the blood stream. Both of these views may be correct. Finally, however, the products of both the thyroid and parathyroids reach the blood stream and are carried to the pulmonary alveoli where they combine and are taken up by the red cells along with the adrenal secretion (Sajous).

There has been some conflict of opinion concerning the relation existing between the secretion of the thyroid and parathyroid structures. The dual theory propounded by Gley, that the parathyroids supplement the function of the thyroid, has not been adopted generally, most observers holding that the parathyroid glands are functionally independent of the thyroid. Sajous, however, contends that his conception sustains and completes that of Gley, and mentions the findings of Edmunds who showed the intimate relation between the two structures. He also claims that "the parathyroid constituent of hemoglobin enhances oxidation by increasing, as a ferment, the vulnerability of the phosphorus which all cells particularly their nuclei contain, to oxidation by the adrenoxidase in the blood." Various observers, of whom Sajous was probably the first, attribute to the thyro-parathyroid secretion an action similar to that of the opsonins and autoantitoxins. Sajous summarizes the evidence, in this connection, as follows:

"1. The thyro-parathyroid secretion and the thyroid preparations used therapeutically act by increasing the sensitiveness of the phosphorus of all cells, particularly their nuclei, to the oxidizing action of the adrenoxidase, and thus enhance metabolism and nutrition."

"2. They also, in virtue of this action, augment the auto-protective or immunizing power of the blood, by increasing the sensitiveness (as opsonin) of all bacteria, their toxins, endotoxins, toxic wastes, etc., that contain phosphorus to oxidation, and thereby to the digestive or destructive action of the complement, both in the blood and in its phagocytes."

It is generally believed that there is a very close relation between the functions of the pituitary body, the adrenal, the thymus, and the thyroid apparatus, but the limits of this paper will not permit discussion of this phase of the subject.

Clinically it is well to determine just how important a properly functioning parathyroid apparatus is to the organism. The results of

both experimental and clinical observations upon this point forces the conclusion that these structures are directly concerned in the development and the well-being of the animal, and anything which upsets the balance of this function, either by increasing or diminishing the activity of these glands, acts in a hurtful manner upon the organism. Total extirpation of the thyroid and parathyroids produces marked disturbances and soon terminates fatally. On the other hand, over-activity of these glands results in a characteristic symptom complex which may prove fatal. There are, therefore, clinically two thyroid conditions quite at variance from each other, which are termed hypothyroidism, when the secretion is lessened, and hyperthyroidism, when it is increased.

In the first class of cases there is a distinct lack of the thyroid secretion, either from absence of the gland, inadequacy, or perversion of its secretion; and this condition may occur even when the gland is enlarged. As a result various nutritional disturbances are noted, differing greatly in degree, from the most trifling changes to the severer forms of cretinism and myxedema. The chief of these phenomena are languor and somnolence, the patient showing fatigue easily. These symptoms are most prominent in the early morning and disappear in part as the day advances. The patients are always complaining of feeling cold, especially in the extremities, and the body temperature is low. A full meal is likely to bring improvement, especially if alcoholic beverages are ingested. The patient appears older than the years would indicate, may be prematurely gray and show patches of loss of hair, which is dry, brittle and coarse. The skin is likely to be also coarse and rough, and pads of fat, especially over the clavicle, are seen in marked cases. Dyspnea or a sense of oppression due to deficient oxygenation of the blood is complained of upon exertion. The blood pressure is low, and the pulse weak and rapid. Anemia is the rule. Defective development of the bones and muscles is to be noted. Melancholia and hallucinations are sometimes observed. These individuals are classed in school as backward, dull, or lazy. More marked cases of hypothyroidism in infants result in typical cretinism, and in adults myxedema.

The second class of cases—hyperthyroidism—results from over-activity of the thyro-parathyroid apparatus, and usually occurs in conjunction with an increase in the size of the gland and in its secreting structure. It is well

to bear in mind, however, that this condition may develop in a gland of normal size. The gland is usually quite firm and vascular, especially in the more acute cases. Dr. Louis B. Wilson has shown that there is a definite relation between the amount of functioning tissue and the absorbable secretion in the thyroid gland, and the severity of the symptoms of hyperthyroidism. In this report there is a close parallel between the new secreting structure and the clinical condition of the patient.

Under the microscope, in active cases, there is an increase of the parenchyma, which may appear in the alveoli as an increase in a single layer of epithelium or a reduplication of layers, or there may be an actual increase in the alveoli. In some of the chronic cases degenerative changes and exfoliation of the epithelium are found. In such specimens the patients were showing some amelioration of the symptoms. These findings seem to explain, in part, at least, how in certain cases there is a change from simple to exophthalmic goiter, and how again an exophthalmic type may be improved and again assume the simple type. In simple goiter there may develop a sudden increase in size, as oftentimes occurs at puberty, during menstruation, and in pregnancy. Along with the increase in size there may develop symptoms of Graves' disease. Again, after such symptoms have been present for a time, they may subside and only the phenomena of a simple thyroid enlargement remain. The gland itself under such circumstances may decrease in size quite perceptibly. A degeneration of the secreting structures in the gland, and a blocking of the lymphatic drainage, account for the change in the clinical picture.

ETIOLOGY.

The cause of hypothyroidism may be classed as hereditary or acquired. Among the hereditary causes may be mentioned syphilis, alcoholism, and gouty diathesis. Consanguinity in marriage has been classed as a cause. The acquired form occurs as a result of too frequent pregnancy, from exhaustion of the thyroid apparatus. Prolonged lactation probably acts in the same way. The milder infectious diseases of childhood may also cause interstitial and parenchymatous lesions in the gland which may result in hypothyroidism. Injury to the thyroid may also produce it, and likewise it may occur as one of the late changes in exophthalmic goiter where the secreting structure of the gland has undergone atrophy.

The etiology of hyperthyroidism and exoph-

thalmic goiter is still in doubt, and we are unable to make any positive statement regarding the causation of this condition. Sajous and Salmon have concluded that the pituitary body is the site of the primary irritation. The former explains the development of hyperthyroidism and exophthalmos upon the assumption that toxic materials in the blood act upon the center of the thyroid and adrenals in the pituitary body. In cases of endemic goiter some observers have concluded that the disorder is produced by the water supply, and investigations have been made to determine just what principle in the water is the active agent in the production of this affection. The most notable investigations in recent years are those of Chambers and McCarrison. Chambers reported to the British Medical Association as follows:

"Many attempts have been made to find evidence of organismic infection. Several hundred sections have been made in some cases, and have been treated by various methods for showing organisms in tissues. Bacteriological examinations, including animal inoculations, have been made in a few cases. The results have been negative. Nevertheless, the histological characters suggest a toxic substance present in the thyroid gland, in some cases diffuse, and in others localized. As to the nature and origin of this substance, we are at present entirely in the dark."

McCarrison, believing that the toxic agent was of bacterial origin, made some investigations of the water from a well-known goitrous well, and reported his work in 1909. The water was passed through a Berkefeld house filter and the filtrate administered in quantities of four ounces in milk each morning before breakfast to six healthy young men between the ages of 18 and 20 years, all showing enlargements of the thyroid gland. McCarrison was the next subject of experiment. At the end of fifteen days his neck had increased 2 cm. in size, and a uniform enlargement of the thyroid was noted. He subsequently repeated the experiment, using the same water boiled, both on himself and seven other men, with entirely negative results. He therefore concludes that goiter is due to matter suspended in water and that this matter is not mineral but a living organism. His theory seems strengthened by his report of sixty-eight cases of goiter cured by the administration of thymol. He says "the main action of this drug is a local one in the intestine owing to the fact that in the absence of oil, alcohol, or other of its solvents, it is very sparingly absorbed. Its curative action is very strong though not conclusive evidence that

the habitat in man of the organism responsible for the production of goiter is the intestinal tract."

Short denies, however, that this evidence points strongly in favor of infection, and rather holds the view that goitrous water depends for its goiter-producing qualities upon minute traces of some metal having a great affinity for iodine and forming with it an insoluble compound. Heredity, fright, and other violent emotions, fatigue and exhaustion, as well as some infectious diseases may cause or at least exaggerate the condition of hyperthyroidism.

Among the affections of the thyroid may be mentioned the following: (a) abnormalities, (b) absence of whole or part of the gland, (c) accessory glands, (d) failure of closure of the thyroglossal duct with formation of fistula or cyst, (e) atrophy.

In addition to these may be mentioned the circulatory disturbances so frequently present. The variations in the vascularity of the thyroid within normal limits is considerable. Undoubtedly this is a sex gland in addition to some of its other functions. An increase in the vascularity and therefore the size of the thyroid occurs at puberty, during menstruation, after coitus, and in pregnancy.

The number of enlargements in females greatly exceeds that in males. Hemorrhage into the gland is not of infrequent occurrence in cases of goiter. Inflammation is very rarely seen in the normal sized gland, but an acute inflammation of the goitrous gland is occasionally observed. The symptoms are at times distressing in such cases. Local tenderness, swelling, and heat are present, accompanied with extreme anxiety, nervousness, dyspnea, palpitation, cardiac distress, sleeplessness, and muscular tremor; in fact, exaggerated symptoms of Graves' disease. These cases are best managed by free purgation, the local employment of ice over the gland and over the heart, absolute rest in bed and the administration of some sedative, such as bromides. Opium had best be avoided in these attacks, as individuals of this type are prone to become habitues.

Following some of the infectious diseases suppuration in the gland has been reported, but its occurrence is rare. Some writers describe a form of chronic inflammation which does not produce hyperthyroidism, but rather tends to diminish the size of the organ. Tuberculosis of the thyroid gland occurs with extreme rarity, and is usually found in connection with a gen-

eral tuberculosis. Syphilis of the thyroid is an extremely rare condition.

FORMS.

The most important study in connection with this structure is that of goiter, which is more or less intimately connected with increase in its size. The enlargements of the thyroid gland may be divided into: (a) simple, (b) exophthalmic, and (c) malignant.

Simple enlargement of the thyroid is perhaps the most frequent affection of the gland. It occurs as a distinct increase in size with a steady growth, or perhaps at times accompanied by periods of rapid but temporary increase, without nervous phenomena or any other symptoms than enlargement.

In time it may produce symptoms from pressure upon the trachea, laryngeal nerve or other structure, and the patient consults a physician because of these symptoms or because of the deformity which results. In some of these cases symptoms of hypothyroidism are observed.

The second type, known as Graves' disease, is always a form of hyperthyroidism. Usually enlargement of the gland is present, but the symptoms may develop without visible enlargement. Advanced cases are easily recognized, but in the early stages this type may be quite easily overlooked. Exophthalmus, enlargement of the thyroid, tachycardia, palpitation of the heart with irregularity, nervousness, which may be extreme, muscular tremor, and paroxysmal dyspnea, are seen during the course of this affection. While some of them may be absent, in most of the severe cases all of these symptoms will be noted. There is a tendency to cardiac dilatation. The cases coming to autopsy show this condition to a marked degree, as well as fatty degeneration of the heart muscle. These changes account for the sudden deaths which occur in some of these cases.

The diagnosis of the different forms of goiter should not be difficult if careful observation be made of the patient from time to time. The location of the enlargement and its motion with the trachea during deglutition are sufficient to prove its thyroid origin. The absence of symptoms characteristic of Graves' disease and the very slow growth will force the diagnosis of a simple goiter. The pressure of even a slight bulging of the eye and rapid heart action make a chain of evidence sufficient to justify a diagnosis of exophthalmic goiter. Where these symptoms are not well-marked, the presence of muscular tremor, especially after brisk exercise,

points to this affection. Certain ocular signs are also valuable in the early diagnosis of this condition. The most important of these is what is known as von Graefe's sign, although described eight years previously by Demarres. In the movement of the eye downward, the eyelid does not follow the line of vision normally, but does so in an irregular spastic manner. Stellwag called attention to the fact that in cases with marked exophthalmos there is present a retraction of the upper eyelid while the lid remains much more stationary than it does under normal conditions, and there is a decrease in the frequency of winking. Moebius, in 1895, observed that in goiter there is insufficiency of convergence.

Malignant disease may be recognized by its sudden and very rapid increase in size, by enlargement of the adjacent glands, and perhaps by its consistency. If the mass becomes attached to surrounding structures it shows infiltration and this is strong evidence of malignancy. It is well to remember that fixation may follow the use of injections into a simple goiter. Cachexia and loss of flesh occur early in carcinoma.

The prognosis varies greatly, depending upon the variety of the affection, and the faithfulness with which treatment is employed. In simple goiter the prognosis is usually good. It must always be understood that exophthalmos may develop. In Graves' disease the prognosis is more serious, and while some patients respond rapidly to treatment a large number do not. Surgery is fraught with considerable danger in this class, and still the results are remarkably good, especially if operation is performed before cardiac changes are advanced. The malignant form is especially grave, permanent cure being rarely obtained. The operative mortality, too, in this form is great.

TREATMENT.

This brings us to a consideration of the treatment of this affection. What are we to advise patients suffering from goiter? My personal experience has led me to the following conclusions, which may not agree with the views of others, but I feel very safe in the stand I take:

In all simple enlargements, during the early stages I advise a course of medical treatment. This consists of careful attention to the water supply, general attention to the bodily hygiene, the employment of iodine internally and locally, and the administration of thyroid extract. In the presence of hyperthyroidism, the employ-

ment of thyroid extract will increase the symptoms so promptly that a diagnosis can be made and the remedy discontinued. This plan has kept the affection under control in a large number of cases coming under my observation. McCarrison has found thymol of benefit in certain cases. Ochsner commends very highly the treatment of simple goiter by injection of 5 per cent. carbolic acid solution directly into the gland, as proposed by his old teacher, Gunn. In the opinion of the writer a large percentage of cases of goiter, especially the simple type, ought to be carried to recovery, or at least any increase in the size of the growth prevented, without the necessity of subjecting the patient to operation; and the most careful consideration should be given all these patients before surgery is advised.

An objection may be urged to the method of treatment recommended by Gunn because of the fact that adhesions may form, thus rendering subsequent operation more difficult provided it should become necessary. Some observers have reported excellent results from the use of chromium sulphate internally, and as already stated McCarrison claims a cure in sixty-eight cases by the internal administration of thymol. Other authors have recommended the employment of the X-ray, the introduction of iodine into the substance of the goiter by cataphoresis, etc.

Failing to obtain improvement by the judicious employment of medicinal measures, partial thyroidectomy is to be recommended. For the exophthalmic type the most important therapeutic agent at our command is rest. This should consist of rest in bed when the symptoms are aggravated, with absolute freedom from all forms of excitement. During convalescence the patient should be prevented from dancing, card-playing and all other social activities which are conducive to excitement. Sexual intercourse should be prohibited, and exercise should never be carried to the point of fatigue. A change in water supply or boiling the water will prove advantageous. The writer has found the tentative employment of iodine locally and internally of benefit, although some authors condemn the internal administration of the drug in this type of disease. The use of hydrobromate of quinine has been beneficial in the hands of some observers. The serum treatment of Beebe may be of service in some cases, and Rogers claims to benefit cases recurring after operation by the administration of fresh thyroid preparations. He gives this

preparation in very small doses and claims that its action is not the same as that of the dried gland. In the experience of the writer the administration of thyroid extract is contraindicated, as it tends to aggravate all the symptoms in this form of goiter. Thyroidectin in five grain doses has been recommended in this condition.

The most exaggerated cases subjected to the plan of treatment herein advised will show amelioration of the symptoms, and although only a small proportion will be restored to health, many of the patients may be brought to a condition more favorable for operative intervention. The fact must not be overlooked that in exophthalmic goiter there will oftentimes occur a recession of the symptoms even without any especial form of treatment. It is unwise to operate in the height of the process, as in most cases the patient may be safely conducted to a quiescent period when operation may be undertaken with greatly diminished risk. For the malignant cases early and radical removal offers the best chance. Grafting of thyroid tissue may sometimes be necessary in these cases to supply the loss of gland structure owing to the fact that the operation must of necessity be very radical.

A few remarks concerning the operative treatment of goiter may not be amiss. In hypothyroidism the operative risk is markedly less than in cases of hyperthyroidism, and yet in the main the technic is almost identical. The surgeon should first determine whether or not a total or a partial extirpation of the gland or one of its lobes may be safely undertaken. In some cases operative intervention will of necessity be limited to ligation of one or more of the vessels supplying the gland. In a few instances this will be all that is necessary to obtain a symptomatic cure. In others this step will be simply a prelude to a more complete operation at a later date. Some observers believe that ligation of the vessels will show almost as high an operative mortality as the more radical procedure, claiming that the manipulation necessary to its performance will require equally as much time and produce greater damage to the gland than does extirpation.

Before undertaking the operation the attendant should fully consider the best anesthetic to be employed in each individual case. Considerable diversity of opinion has been expressed upon this point. Some surgeons prefer the use of local anesthesia exclusively as the

best method of conserving the patient's vital forces, while others depend entirely upon general anesthesia, and still others (notably Crile) prefer the anoci-association method, by the employment of which it is claimed all noxious psychic influences are removed. The writer believes that with proper selection any one of these forms of anesthesia will permit the safe conduct of the patient through the trying ordeal.

Crile, of Cleveland, and Dunhill, of Melbourne, have given some interesting reports upon the operative treatment of goiter in recent years. The results of these gentlemen are practically the same, although their methods of anesthesia are quite different. Crile claims that he reduces the operative shock and lessens the mortality rate very materially by employing a so-called anoci-association, believing that by removing from the patient the knowledge of the time at which the operation is to be performed, and keeping her under the impression that she is being treated daily by inhalation methods, he can do away with psychic shock and thus obtain more favorable results. By the administration of morphine and scopolamine prior to the giving of the general anesthetic he claims to have reduced the number of devitalized brain cells very materially. He employs nitrous oxide in place of ether, and says that this has also reduced the devitalized brain cells to one-quarter.

Dunhill's work is most remarkable. He employs 1 to 500 novocaine, using several ounces for local anesthesia, infiltrating all the tissues in the front of the neck. The most significant feature of his work, however, is the fact that he operates on patients showing the most advanced muscular changes, with very badly weakened hearts, refusing practically no case. He reports four deaths in three hundred and eighty operations of all classes, two hundred and thirty of these being of the exophthalmic type—a most remarkable showing. To the writer this practically refutes Crile's claim for his anoci-association idea. Most of the patients that we see much prefer to have the operation undertaken promptly after they enter the hospital for that purpose. The anticipation and dread of an operation, the time for the performance of which is uncertain, seems to me to be more likely to produce psychic shock than for the patient to know the exact date thereof. And Dunhill's work seems to prove that the operation can be safely executed in the most serious cases without any increase in the mor-

tality or distress to the patient, although she may be conscious throughout the entire procedure. It is my belief that careful hemostasis and no blood loss, with a short time on the operating table and little manipulation of the gland during the operation, will enable surgery to be performed upon this organ with comparative safety.

In the execution of the operation it is well to manipulate the gland structure as little as possible, thus avoiding the expression of any quantity of its contents into the tissue of the neck, which might produce symptoms of hyperthyroidism immediately subsequent to the operation. The more rapidly and dextrously the operation is performed, the less will be the danger of the development of such symptoms. Most operators employ drainage in these cases to permit the escape of any excess secretion from the neck. It has always been an open question in the mind of the writer as to whether or not drainage is necessary in any of these cases. Some of our results have been equally as good without drainage as in cases where it was used.

Among the dangers of thyroidectomy may be mentioned hemorrhage and sepsis, both of which should be avoided in the hands of a competent surgeon. Injury to the recurrent laryngeal nerve ought not to occur if the technique is carefully planned and executed, although in some very large growths there is such anatomic distortion as to make it difficult to avoid such an accident. Injury to the esophagus has been known to occur, resulting in a troublesome fistula. Following the operation tetany has been known to develop, in the treatment of which extract of thyroid gland or the parathyroids should be employed, a combination of both being most effective. Even where there has been no injury of the laryngeal nerve, some of the patients will complain of their voice being husky, or there may be marked hoarseness. This symptom usually subsides in a short time. Pneumonia may develop after this operation, especially if ether is used as an anesthetic. While this is a rare complication, still the fact of the possibility of its development must not be overlooked.

In some instances the operation is performed purely for its cosmetic effect. It is advisable, therefore, that the incision be made in such a situation as to cause the least amount of deformity after healing has occurred.

In the conduct of an operation for the relief of this condition each surgeon develops a tech-

nic which is most satisfactory to himself. The operation can be completed readily and with safety under local anesthesia. In very highly nervous individuals gas-oxygen or ether anesthesia will prove more satisfactory, but will add something to the danger. The low collar incision will be most effective for all cases. A dissection should be made with the keen edge of a scalpel, and with the least possible insult to the tissues. Manipulation of the gland during its removal tends to express a quantity of its secretion into the lymph spaces and in that way may produce the symptoms of intoxication which sometimes follow the operation. After the platysma and deep fascia are lifted with the skin, and the superficial veins doubly ligated and cut, the sternohyoid and sternothyroid muscles are retracted, or, in rare instances, divided and the gland exposed. The latter is then readily lifted and its arterial supply occluded. In dissecting the gland care should be employed to leave the fascia on its posterior surface containing the parathyroid glands. A clamp is applied at the attachment of the body or lobe to the isthmus. After the gland is cut away this stump is sutured in such a way as to control hemorrhage and to cover the raw surface. In this way the secretion is prevented reaching the cellular spaces in excess. If both lobes are to be removed special care should be given to the parathyroids and a small portion of the glandular tissue should be left. Careful hemostasis and careful approximation of the fascial and muscular planes will materially improve the post-operative condition. If drainage is desired a small cigarette drain can be placed in the lower portion of the wound, to be removed on the second or third day.

CONCLUSIONS.

In conclusion the writer desires to emphasize the following suggestions:

(1) That in a large percentage of cases of simple goiter the patient may be relieved by medical treatment:

(2) That in some cases of exophthalmic goiter the patient may also be brought to recovery in the same way, but the larger proportion should be operated upon before degenerative changes have destroyed the cardiac musculature:

(3) That in all cases where operation is to be undertaken the surgeon should be careful in selecting the anesthetic best suited to the patient and his own convenience:

(4) That the operation should be executed

without great loss of blood or waste of time and with the least possible manipulation of the gland structure, thus conserving the resistance of the patient:

(5) That in certain cases the thyroid and parathyroid extracts should be administered:

(6) That the same hygienic rules should be followed after the operation as prior thereto:

(7) That the results of operative intervention have been remarkably good, the mortality being between 1 and 2 per cent.

SO-CALLED BLADDER DISEASES.*

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LAKE LINDEN, MICH.

The bladder stands in relation to the organs of the Wolfian system from which it takes its origin the same as the stomach does to its system of the intestinal tube and the various embryological and histological divisions thereof. Doctor Wm. Mayo has said that the stomach is the receiving station for all troubles in the intestines and gall-bladder, etc., and we can say that the sympathetic fibers carry the message of troubles from the kidney, ureter and the bladder to the trigone area as a trouble station giving warning of disease somewhere along the urinary tract. Therefore, subjective symptoms in the bladder may be the only signs noticeable, while the underlying lesion of the disease gives no definite localizing indication whatever.

Furthermore, a disease may begin as an infection of the bladder and by extension, as I will describe later, become a distinct pyelitis making of the disease only a so-called bladder difficulty. When treated as such latter disease, we can readily see the fallacy of expecting a cure. This class of cases are many, as I have demonstrated in my own practice as well as in consultation work. It is by the cystoscopy and the ureteral catheter that a true differentiation and a localization can be made, and furthermore, a certain proportion can be only successfully treated by a direct application through the cystoscope or the ureteral catheter. I wish to warn against the "trust-to-luck" and pure medical care of this class of cases because we have many patients with annoying and distressing symptoms and patients who are constantly in danger of various degrees of absorption and of sepsis from infection of this region as well as other parts of the body. Therefore

*Read before the Houghton County Medical Society, April 8, 1918.

I would make a direct plea for a more careful and accurate diagnosis in this series of pathologic conditions. Hunner of Baltimore in a recent article reported how we have used the terms "irritable bladder," "neuralgia or neuritis of the bladder," or "neurasthenia with the mind centered on the bladder" as definite diagnostic entities, or to cloak our ignorance in seeking to classify that group of patients who suffer from so-called cystitis, and do not respond to the ordinary treatment of cystitis, or casual treatment after cystoscopy where no local cause could be found. Some of these patients suffer intensely even to the degree of incontinence, sometimes from a urethritis that is relieved when some far removed source of infection has been eradicated, as an infected tooth, or tonsil, or a suppurating sinus.

This discussion will make a study, as exhaustive as the time and conditions will permit, to demonstrate the disease that will give bladder difficulties having their source in the ureter, pelvis of the kidney, or the kidney, or some extraordinary location.

URINARY CAUSES.

1. *Renal Tuberculosis*.—The first of importance in the urinary causes is renal tuberculosis. It is a known fact that many observers have studied and demonstrated that renal tuberculosis can be present for even many years with only vesical symptoms for a long time. Not until cystoscopic examination with the use of inoculation and the microscope shows the source, does the method of treatment change. Unfortunately, as I have seen in a few cases, the bladder has been seriously injured by this old infection and that removal of a tuberculous kidney saved the patient's life and made life bearable, nevertheless, the bladder needed much treatment to eradicate the disease from this organ, which consisted of ulceration, edematous and hemorrhagic cystitis.

Males are more subject to this bladder irritability than females and hematuria which accompanies tuberculosis of the kidney is frequently due to ulceration of the bladder, occurring more commonly in the male.

In Braasch's series of 203 cases of renal tuberculosis "90 per cent. of the patients have vesical symptoms extending over a period of six months, and more than 50 per cent. more than a year. The remainder had vesical symptoms, the cause of which remained unrecognized in some instances as long as ten years."

I wish to present two case records that illustrate very well this phase of the subject.

1. Mrs. D. B., who was 35 years of age, married, with husband living in good health, had three living children—baby five months old. Her family history was practically negative except that she was the oldest of thirteen children with seven living, other six died in infancy—causes unknown.

Personal History.—Has had all children diseases except scarlet fever—no sequelae; menstrual history negative and twenty-eight day type; married at 25 years and had three moderate labors—no forceps and no lacerations. Baby is living at five months. Five years ago had a dry plerisy but recovered nicely.

Present Illness.—Had little bladder difficulty before the last child was born, but afterwards had to urinate very frequently with pain, and did not feel well otherwise. For first two months micturition occurred four times at night and q. two to four hours daily. For last three months has been losing weight and felt sick with more frequent and painful urination both day and night. Pain was very severe at times extending over the whole abdomen, but for the last three weeks localized itself to the right lumbar region, where she thinks she feels a tender mass. She vomited but once. Has had chills fevers and headaches at times. Urine became mucky for last three months, being cloudy and having a peculiar odor.

Physical examination: 2 p. m., January 4, 1917, Temperature 99.2° F., Pulse, 100. Emaciated and looked sick. Mouth negative; neck negative; chest and heart negative; breasts are secreting (nursing).

Abdomen: Negative except for the firm mass, the size of one and a half to two kidneys, fairly movable on breathing in the region of a movable kidney on the right side. This is the mass the patient found herself. Left side negative and the kidney is palpable.

January 6-7, 1917. Temperature 101.6° F., Pulse, 100-99.

Cystoscopy: January 7-9, 1917. Bladder normal except for great deal of edema one inch about right ureter opening with pus running out from that side. The right ureter opening was obscured. Left ureter opening normal. The ureters catheterized.

Specimen of urine from bladder very cloudy. 1,020, acid. Albumen ++ Sugar negative. Sediment great deal of pus and very few red blood cells.

Ureter specimen: Right, nearly pure pus, 1,009, acid. Albumen ++++ Sugar negative. Sediment, pure pus. This specimen sent to the State Bacteriological laboratory at Houghton. Reported negative, (which does not correspond with the kidney findings.) The bacilli demonstrated in the urine later.

Left, specimen clear, 1,020, acid. Albumen negative and sugar negative; ind. negative. Sediment negative except for few red blood cells.

Phenol-sulphonphthalein test: Right side, dye appeared in thirty minutes; left side dye appeared in five minutes.

I did a right nephrectomy on January 11, 1917, using a long oblique right lumbar incision. The kidney was adherent to fatty capsule and the pelvis much dilated and the ureter indurated. The last appeared like a thickened acutely inflamed appendix.

In enucleating the kidney and ligating the pedicle I had to use great care in not including the dilated pelvis in my ligature. The stump of the ureter was injected with ninety-five per cent. carbolic acid. On account of the soft and mushy wall of the ureter it was necessary to put in a small drain before closing the wound. She had practically an uneventful recovery with a pulse ranging no higher than 106, temperature remaining normal on the seventh day, and the urine increasing from eight ounces to nearly a quart. The sinus remained open for some months but with the exception of considerable bladder irritation up to a few months ago she has made an excellent recovery and has been practically doing her own work after five weeks following the operation.

Case 2. Mrs. F. N., married, age 36 years. Husband is living. She had nine children, baby six and one-half years of age.

Family History: Father died at sixty years, of accident. Mother is living at seventy-two years. Is fourth of thirteen children, five living and eight died in youth but there was no tuberculosis nor cancer in the family. One daughter, 15 years of age, has had a bone tuberculosis six years ago but is cured at present. She has now a phlyctenular conjunctivitis.

Personal History: Had measles at three years—no sequelae. She menstruated first at 13 years, regularly, q., twenty-eight days, with moderate flow, three to four days in duration having no pain. At present this function remains the same.

Married at 17 years. Had nine moderate labors with no forceps or lacerations. At 30 years of age had an incipient pulmonary tuberculosis with a cough, with temperature 99.6° to 100° F., p. m., for a whole winter, but was apparently cured. During this time a moderate cystitis appeared, which lasted for three weeks.

Present Trouble: In September, 1914, had a so-called cystitis, which consisted of tenesmus, severe pain in the bladder region, frequent urination, with a mucky pussy urine which contained at times some blood. This did not cease until after the operation in 1915. In fall of 1915 and during winter of 1915 until June, she suffered for a few hours at times with intermittent colics in right renal region and along the ureter. In April and May, 1915, these colics occurred every day, causing her to remain in bed most of the time. Patient lost about twenty pounds in weight. Bladder lavages did but very little good. The temperature during this time ranged between 99.6° F., to 101.2° F., p. m., with occasional chills. She did not submit to full examination until May 24, 1915.

Physical Examination: Temperature 101.2° F., p. m. Pulse, 100 to 104.

Mouth, neck, lungs, heart, all negative.

Abdomen negative except for slightly enlarged and tender right kidney with tenderness on pressure along the right ureter. Bladder area also tender.

Pelvis negative.

Cystoscopic examination demonstrated an ulcerative and a bullous cystitis marked about the right ureter. The urine from the right ureter contained a moderate amount of pus and a small amount of

blood. The left ureter urine was practically negative. Tubercle bacilli were demonstrated in the pussy urine after many specimens were examined. Excretion of dye was not recorded.

The diagnosis was a clear case of right sided renal tuberculosis.

Operation: June 7, 1915. I did a right nephrectomy using a long oblique right lumbar incision, and tying the pedicle with kangaroo tendon. The stump of the ureter was injected with ten to fifteen drops of ninety-five per cent. carbolic acid. Wound closed without drainage after filling it with normal salt solution. I opened the wound on the fourth day on account of suppuration and the sinus remained open for four months. Convalescence was rather slow and she did not leave the bed for three to four weeks.

The bladder ulceration soon improved materially so that in six months from the nephrectomy there were very few cystic symptoms. I saw her March 23, 1918, and she was in perfect health without any bladder difficulty whatever.

PYELONEPHRITIS.

We classify under this head infections other than the Kock's bacillus the causative factors being the colon bacillus, staphylococcus, streptococcus and gonococcus—colon bacillus being the most common. This condition may be unilateral and be accompanied with marked ulceration of the bladder and vesical irritability. This, of necessity, would be confusing with renal tuberculosis, requiring inoculation of the guinea pig to differentiate. We can readily appreciate that a diagnosis could not be made without the refined methods of separating the renal secretions. With pyelonephritis we may have remissions but even after treatment of the pelvis of the kidney where the condition is more limited to the pelvis, we cannot say according to Braasch, Kretschmer, etc., that a cure has been attained till the urine catheterized from the ureters contains no culturable germs.

Pyelograms and functional tests with phenosulphonophthalein gives us much assistance, although, occasionally, with considerable presence of pus in the segregated urine, we get a fair degree of time excretion of dye. In 121 cases reported from the Mayo clinics in 109 cases the cystitis came from pyelonephritis. Braasch also says that the proportion of cystitis in the adult female accompanying this condition is greater and more frequent than in the male.

Pyelonephritis with the infection and stricture of the ureter give us the surgical kidney that is so frequently spoken of.

PYELITIS AND URETERITIS.

I give this the honor of a place in classification because of the great number of cases of this type that go unrecognized, where the bladder is subjected to accusation, and the cause of prolonged infection lies in the pelvis of the kidney and ureter with strictures, and feeds the bladder with pus and the germs of infection. Some of these commence as cystitis, or urethritis or extravescical from exanthemata or focal infection. The only treatment consists in dilatation of the ureter infected, and treatment of the pelvis of the kidney directly through the ureteral catheter. A man 47 years of age, came to me with severe intermittent attacks of so-called cystitis—pus in varying amounts and small amounts of blood, tenesmus, and severe pains. No doubt it originated in an old badly instrumented post—urethritis. He had been treated for one year in the ordinary medical way. Until he permitted me to dilate a partial stricture of the right ureter, and give lavage of the right renal pelvis and ureter, I obtained no results. This diagnosis was verified by one of our best genito-urinary men. My method of treatment resulted in a cure, following dilatation and lavage of the renal pelvis.

LITHIASIS.

As far back as 1852 in reviewing an old volume of Wood's Practice of Medicine I found that the stone of the kidney and the ureter mentioned as cause of symptoms in the bladder. The bladder symptoms as we recognize them are frequency of urination, and irritability with varying amounts of pain. At the Mayo clinics 70 per cent. of this type of cases had distinct vesical symptoms. We know that an impacted stone in the ureter near the bladder can give quite serious signs of an acute cystitis with presence of blood, and has occasionally caused a considerable error in diagnosis. The colics of lithiasis, when there is obstruction, or an attempt of movement of the stone or just the presence of a stationary stone in the ureter are not as classic as we would desire them to be for easy methods at a guessed diagnosis, and in our experience we can call to mind serious results, even death, coming to patients whose apparent recovery from attacks lead us into only an apparent safety.

In a young man in whom I diagnosed a pyonephrosis with stone in the left kidney, we observed some pain in the kidney region, but he had a distinct irritable bladder. Cystoscopy and X-ray cleared the mooted question. After

removal of the kidney which contained several irregular stones and several abscess pockets, he made an excellent recovery.

EXTRAURINARY CAUSES.

Many women have been subjected to fancy operations of the pelvic organs of various types—removal of the ovaries, cystocele operations, and displacement operation—to relieve an irritable bladder, and still the irritable bladder remained. Through a careful cystoscopic examination we can demonstrate the presence or not of any urinary cause and establish to what extent the pelvic deformity or disease acts as the cause.

Recently I examined a woman of 35 who had an irritable bladder for many years following a nephrectomy for renal lithiasis and abscess. Her infection came from an ulceration of the left ureter by an adjacent abscess. I saw in the bladder eight years following the nephrectomy a distinct bullous area about left ureter opening, and from symptoms in pelvis believe that the irritability of the bladder was caused by pelvic inflammatory conditions in the original site of the abscess. She had colics in the left pelvis with a tenderness in this area.¹

There is a large question in my mind if an otherwise normal uterus in abnormal position can cause an irritable bladder.

The conditions which may act extraurinarily as causes of vesical symptoms are:

1. Pregnancy.
2. Tumors.

According to experience at the Mayo clinics, they find very few large tumors the cause of vesical symptoms. In fact Braasch cites a case of a woman 32 years of age with a tumor of the pelvis and an irritable bladder. Hysterectomy was done for uterine tumor but she was no better. On cystoscopic examination one year later it was discovered that she suffered from tuberculosis of the right kidney. Right nephrectomy was done and a year later she reported that the so-called bladder difficulty disappeared.

3. Malignant extension.
4. Inflammatory extension, as I cited in my case above.
5. Mechanical interference as displaced uteri, cystocele, and rectocele. These are given

1. This patient came to operation April 12th, 1918, and we found considerable pathology in the left pelvis consisting of a very badly adherent, large, cystic ovary, and left tube. The adhesions were very tough and involved the ileum, sigmoid, omentum, bladder and parietal peritoneum, necessitating double ligatures before severing.

more credit for "so-called bladder difficulties" than they really deserve.

In concluding my paper for this evening it would be well to briefly discuss the interesting question of ascending infection which is so little understood. In an article in February, 1918, in the *Surgery Gyn. & Obstetrics*, Doctor V. C. David before the Chicago Surgical Society outlined an experimental study on pyelitis, kidney infection, and ureteritis following a primary infected bladder, using the colon bacillus for the infecting organism and the turpentine bladder for the locus minoris resistentiae. He also reviewed the literature on the subject from 1860 to date.

The lymphatics of the urinary tract received considerable experimental investigation commencing with "Morecagni in 1787 who described a connection between these vessels in the ureter and the kidney." Teichman in 1861, Krause in 1876 described these vessels in ureteral mucosa. Later they were demonstrated in the ureteral muscularis.

Eisendrath and Shulz carried on corroborative experiments and, as the former at the time told me personally, felt that many of these infections traveled along the lymphatics.

Investigations were carried on by men like Zeit, Peterson, Lewin, Sweet, Stewart, Cabot, Crabtree and many others to determine the selection of progress of infection upward of the urinary tract, some concluding that the blood stream carried it and others, the various lymphatics.

It was demonstrated that there is a communicating set of periureteral lymphatics connecting with the lymphatics of the muscularis of the bladder making a distinct route to the perirenal and sub-pelvic tissues. Sakata in 1903 using the Prussian blue method of Gerota demonstrated the above lymphatic connection and that the upper periureteral and sub-pelvis lymphatics drain into the hypogastric, the middle into the lumbar glands, and that an anastomosis between the two sides could occasionally be injected. (David).

Bauereisen advanced the theory at this time, in 1910, following some thorough experimental work which brought out the fact that the lymphatics of the mucosa and muscularis of the ureter communicated, and that the choice of travel of infection upwards was by the lymphatic route. He also believed from his experiments that you could have lymphatic infection of the kidney without encroaching upon the mucosa.

David's conclusions are very significant, and briefly stated include the following: In unobstructed bladders, infection may ascend the lumen of the ureter but it is not common. In obstructed bladders, partially or totally, infection most frequently does ascend more commonly by the lumen in shorter time than by the periureteral lymphatics, going to the sub-pelvic fat and by contiguity spreading to the pelvis of the kidney. The presence of a perivesical infection encourages a quicker extension to the pelvis of a kidney, or the kidney, or the perirenal region.

I wish to acknowledge that I freely draw extracts of information on literature from Dr. V. C. David's article.

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ROENTGENTHERAPY IN GYNECOLOGY.*

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Roentgentherapy has taken a definite place in gynecology, and while the indications, the contra-indications, and the limitations are not yet definitely established, sufficient good work has been recorded and is being done in all civilized countries to justify its serious consideration before an organization of this kind.

I treated my first case of fibroid of the uterus in January, 1906, at the request of Dr. Mary Griscom. My experience, therefore, extends over a period of twelve years, and while I have not treated an immense number of cases, this long experience has given me an opportunity to judge the after effects to better advantage than some of the authors who have had a much larger experience with this class of cases, but over a shorter period of time. I believe that the general profession is more anxious to know the ultimate end results than the technic or the immediate effects. In this period of twelve years the technic has, of course, varied greatly, and one should always expect more definite results and more favorable results from the

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modern methods than from those that were employed in the early years. While hundreds of communications and even books have been written upon this subject, there still remains in the minds of surgeons, gynecologists and the general practitioners, a number of doubts and fears which must be given serious attention, and it will be my aim in this paper to devote some attention to the solution of one of these questions.

UTERINE FIBROIDS.

Roentgentherapy has been used more extensively in uterine fibroids than in any other gynecological condition. Therefore, this subject will be discussed first. The first case of uterine fibroids treated by the X-rays and recorded in America was that by Dr. J. E. Hett of Ontario, Canada, published in the *Journal of Advanced Therapeutics*, September, 1904. During the same month and in the same year Deutsch (1) reported upon the relief of the symptoms in four cases of uterine fibroid. Since then thousands of cases have been treated.

The *indications* for treatment of fibro-myomata are: 1st. All cases of myoma in older women in whom there is already a well-advanced anemia, which may be the cause of an anemic heart. 2nd. All elderly and young women with myomas, in whom there is marked organic heart disease, diabetes mellitus, chronic nephritis, marked lung disease, and goiter with cardiac symptoms. 3rd. All patients beyond the age of forty years, in whom there is no contraindication to the treatment. In general, the older the patient and the nearer she has approached the menopause, the more prompt and satisfactory will be the result. Under forty years, Roentgentherapy is not the method of choice, but good results can be obtained, though the younger the patient the more treatment will be required. Even in patients under forty, if the alternative is complete extirpation of the uterus and adnexa, Roentgentherapy should be seriously considered. 4th. The intramural or the interstitial variety of tumor gives the best results.

Krönig (2) says his clinics have abandoned the operative treatment of fibroid for the treatment by the Roentgen rays, except in those occasional cases where it appears that myomectomy may leave a functioning uterus for a young woman. The argument is that the Roentgen rays are just as efficient in their action as total ablation, and devoid of all danger to life, while an operation carries with it operative mortality, even if it is small. The

artificial menopause symptoms in general are not nearly so pronounced as after operation.

Contraindications.—1st. All cases of myoma in which the tumor is pedunculated, or which can be excised without destroying the reproductive powers of the patient. 2nd. Fibroids that are believed to have undergone malignant degeneration, or that have become gangrenous, should not be treated, but if malignant should be operated upon and followed by deep Roentgentherapy. 3rd. Fibroids associated with disease of the adnexa. 4th. Fibroids which are producing such marked symptoms that the patient is endangered more by waiting two or three months for results of Roentgentherapy, than by the results of an operation. 5th. Fibroids associated with pregnancy.

The Probability of Cure.—In the clinical reviews made by Gauss (3) he divided the 1395 cases into three groups according to the dosage given. The first group embraces a total of 693 cases in which the total dosage amounted to from 50 to 175 Kienböck X-units. Group 2 included 544 cases in which the dosage varied from 175 to 500 X-units. Group 3 included 158 patients who were given doses amounting to from 500 to 1,500 X-units. Corresponding to the rise of the total dosage in the three groups, there is a rise also in the percentage of cures of 72, 82 and 95 per cent. It can be seen that the percentage of cures obtained is greater according to the dose of radiation applied to the surface of the body. To this also must be reckoned the fact that, in addition to the increase in dose, the rays applied in recent years have been more penetrating and more thoroughly filtered. In group 3 practically all of the cases of myoma and metropathy that presented themselves for treatment were treated. At least this was true at the Freiburg clinic. Therefore, since all varieties of cases in group 3 were treated, the results must be due to improvement in technic. In group 1 there was evidence of recurrence in 4 per cent; group 2 of 3 per cent, but in group 3 there was no recurrence to record.

It is my opinion that the amount of treatment should be governed more especially by the size of the tumor, for large tumors require more treatment than small tumors, and it requires a greater distribution of the rays and more portals of entry in order to influence the deeper portions of this tumor. If this thought is kept in mind and carried out, the development of malignant disease can be prevented in many instances.

The Cure consists in the relief of all symptoms. Of these the symptoms that causes the patient to seek assistance most often is *hemorrhage*, and this is the first symptom to be relieved. In some cases it is relieved immediately. With the majority, the bleeding of the first menstrual period following the first course of treatment is uninfluenced or only slightly diminished. In the second period, which follows the first and the second series, it may be expected to be diminished or absent, and rarely is there any bleeding after the third course of treatment. In some cases in which the bleeding is continuous over months, it stops almost immediately after the first course of treatment, acting almost like magic. The *disappearance of the tumor* is the latest result, and generally there is no appreciable difference in the size of the tumor during the first month following the first course of treatment. During the second month there is generally a distinct reduction in the size of the tumor which can be appreciated by the patient as well as the attending physician. After this there is a progressive diminution in the size of the tumor, which continues long after the treatment has been discontinued. In one of my early cases, at the beginning of treatment, the tumor extended to the umbilicus. At the end of treatment, and when treatment was discontinued, it was the size of a grapefruit. When next examined, at the end of a year, it was the size of an orange, and when examined five years after beginning treatment, it had entirely disappeared. I believe, therefore, that with modern technic and sufficient cross-firing that the tumors should entirely disappear. They may, however, be expected to atrophy after the treatment has been discontinued, and I believe it is not advisable to continue the treatment indefinitely until the tumors have disappeared, for one can give too much treatment and damage the overlying tissues. The *pressure symptoms* will, of course, disappear in the proportion with which the tumor itself disappears, but generally speaking these pressure symptoms disappear early, within the first month or two, and rarely are present after the third month.

BRIEF RECORD OF MY OWN CASES.

Number of cases of idiopathic hemorrhage, 25. All cured.

Number of cases of fibroid treated, 95.

Number of cases in which treatment was refused, 4.

In one case treatment was refused because the patient was pregnant.

In three cases treatment was refused because there was objection to operation, and I believed that the operation would give quicker and better results.

Of the patients upon whom treatment has been discontinued, and whose present condition is known, there are 67.

Of these 67, permanent amenorrhea has been produced in 56, or 84 per cent.

Temporary amenorrhea has been produced in 4, or 6 per cent.

Return to normal menstruation 4, or 6 per cent.

The tumors have disappeared in 50, or 75 per cent.

The tumors have been greatly reduced in size in 7, or 10 per cent.

Patients operated upon after beginning treatment 6, or 9 per cent.

Patients discontinuing treatment shortly after beginning 4, or 6 per cent.

The records, therefore, show an amenorrhea produced in all the cases that continued treatment, and the tumors have disappeared in 75 per cent., and were sufficiently reduced to give no symptoms in 85 per cent., the remainder either having discontinued treatment shortly after beginning, or have been operated upon.

SUBSEQUENT MALIGNANT DEGENERATION OR FEAR OF MALIGNANCY BEING PRESENT AT THE TIME OF TREATMENT.

This point has been emphasized by surgeons more than anything else, and is given as the greatest contraindication for this treatment. I believe, however, that this fear is very much exaggerated and unjustified. Under contraindications I have, of course, included malignancy, and I believe that if malignancy can be recognized clinically, that there should be total extirpation surgically followed by post-operative X-ray treatment, but this fear of malignancy need not be a nightmare and should not be over-exaggerated, for, in Krönig's (2) third group of cases, consisting of 158 cases, all types of cases were treated as they came, and yet we have no record of malignancy developing. During the past fourteen years in which Roentgentherapy has been used in the treatment of fibroids of the uterus, there surely have been two or three thousand cases treated. It is likely that most of them have been more or less selected, and that clinically recognizable malignancy has been eliminated in the majority of cases, yet we must all acknowledge that only a very few cases have been recorded as becoming malignant afterwards, and in some of these

cases, at least, insufficient treatment has been given to produce results, and the treatment was given at a time when technic was less fully developed.

In one of my cases, Miss S. L., age 33, referred by Drs. H. Lowenberg and M. Griscom, November 18, 1910, the patient was treated for a fibroid which measured, according to Dr. Griscom's report, 7 x 4 inches and filled the pelvis. Operation was refused. June 24, 1911, seven months after beginning treatment, Dr. Griscom again examined her and found a great reduction in the size of the tumor. Her menses had returned to normal. Therefore, we both advised discontinuing treatment because, at the age of 33 we did not want to produce a permanent amenorrhea. Seven years later she was operated upon by Dr. Deaver. At the operation he found a sarcoma about the size of an orange lying to the left of the uterus, apparently detached from the uterus. The uterus had returned to normal and the fibroid had disappeared excepting for two or three very small atrophied or shrunken fibroids of the pedunculated type, about the size of grapes, attached to the outside of the uterus. Since the operation, the patient has remained well. This sarcoma may have been present at the time of beginning treatment. If so, it must have been very much subdued in its malignancy or it would have given more pronounced symptoms with probably metastasis within the seven years before the operation. Therefore, if malignancy was present at the beginning, the treatment surely had an ameliorative effect upon it, and probably encapsulating it, and making a cure more certain as a result of the operation. On the other hand, it is possible that no sarcoma was present at the time of beginning treatment, but that this sarcoma developed later, just as a sarcoma may develop in anyone, the cause of which has not yet been determined. The fact that the uterus had returned to normal, and only a few shrunken masses of the size of grapes were attached to the uterus, would seem to indicate that this sarcoma was not a late degeneration of the fibroid.

One other case of malignancy has come to my attention. This case has been reported by Dr. George Erety Shoemaker (4). This patient, at the age of 49 was found to have a large fibroma of the uterus tightly filling the lower abdomen and pressing upon the urinary tract. She was treated by an electrotherapeutist by means of cataphoresis. She received

one or two treatments a week for nearly a year with no effect. In November, 1907, she was treated by one of my colleagues with small fractional doses of Roentgen rays. The tumor, under this treatment, was reduced to about one-fourth of its original size; the hemorrhage was controlled by April 1st, 1908. Nine months later, in January, 1909, the tumor grew again to the level of the umbilicus, and eleven more small doses of treatment were given. The tumor remained quiet from November, 1909, until November, 1912—three years—when it began to grow, the hemorrhage reappearing in December, 1913. In April, 1914, Dr. Shoemaker removed the tumor which was found, upon microscopical examination, to be sarcoma. There was no sign of extracapsular invasion or metastasis. At the time of the report, April 7, 1915, the patient had reported herself to Dr. Shoemaker as being well. On July 31, 1915, this patient was sent to me by Dr. Shoemaker for treatment of a recurrent sarcoma. At this time, 15 months after the operation, the tumor was about the size of a teacup. After two courses of treatment it was reduced to about half. September 18, 1915, after no further reduction occurred from three more courses, she was requested by me to again consult Dr. Shoemaker, who found her unsuitable for operation. Coley's fluid gave some temporary improvement, but she died of exhaustion at the Presbyterian Hospital June 17, 1916. Autopsy showed general infiltration of the pelvic viscera including the large and small bowel and the bladder, with necrosis in the center of the chief pelvic tumor mass, which communicated with the intestines.

This case is instructive in more than one sense. In the first place, the treatment given originally was not according to our modern technic, but consisted of the small fractional doses in use in 1907. Second, if this were a malignant growth at the beginning, the Roentgentherapy, even though insufficient, according to our modern ideas, held this growth in check for seven years, and during the period of almost five years no treatment had been given, yet the tumor, at the time of stopping X-ray treatment, could still be felt above the brim of the pelvis. Third, the patient only remained free from recurrence after the operation a little more than a year, and died two years and two months after the operation. Therefore, we cannot prove, from this case at least, that the operation was in any sense a

safer procedure than thorough deep Roentgentherapy would have been.

Miller (5) made a study of 9,750 cases of fibroid to determine the average percentage of sarcoma. This was found to be 1.96 per cent. or practically 2 per cent. He also made a study of 6,646 cases as to the mortality from radical myomectomy, and found it to be 4.87 per cent. The operative mortality differs, of course, with the operator, but it also is greatly influenced by the care with which the surgeon selects his operative risks, and by the character of the operation that is necessary in each particular case. In order to determine the primary and permanent results of this same radical operation, he made a study of 180 cases operated upon for sarcoma. Of these twenty-three or 12.7 per cent. were reported free from recurrence of sarcoma after a period of twelve months or more. Of the 180 cases, 81 died, some following the operation and some of recurrence or metastasis. Seventy-six cases were not followed over twelve months. Of the 180 cases, 74 were sarcomata of the uterine wall, with a mortality of 47.3 per cent; 40 were sarcomata of the mucosa, with a mortality of 42.5 per cent.; and 66 cases, in which the kind of sarcoma was not designated, had a mortality of 40.9 per cent. Out of 74 interstitial sarcomata, 32 would have received X-ray treatment, i. e., if one may be allowed to say so, a mistake in diagnosis might have occurred in 43.2 per cent. of the cases. Miller says that, from a consideration of these facts, it seems queer that even with the use of the operative treatment a certain cure of more than 25 per cent. at the most cannot be assured.

As to the relative value of X-ray treatment in these sarcomas, no one can answer, for of course the patients treated by the X-rays can have had no microscopical examination made, and consequently the diagnosis of sarcoma would always be in doubt. Based upon my experience, however, in the treatment of general sarcoma of all types as they are referred to me, I find that I get recovery in about half of them. There is, therefore, no serious danger in mistaking an interstitial sarcoma for fibroid, since the results to be expected from deep Roentgentherapy are at least equal and probably twice as good as from operation.

According to Tracy's (6) records, as well as those of other men, there has been malignancy found in approximately 10 per cent. of the patients operated upon for uterine fibroid. All

authors agree that from 6 to 10 per cent. of the cases operated upon for uterine fibroids are found to be malignant when a careful pathological study has been made. Accepting the worst as 10 per cent., and acknowledging that at least 2,000 patients have been treated for uterine fibroids by Roentgentherapy, then 10 per cent. of 2,000 cases is 200 cases that should have developed malignancy subsequent to the Roentgen treatment. I believe that any fair-minded person willing to judge this subject squarely will acknowledge that if 200 cases of malignancy had developed in women following treatment by Roentgentherapy, that the literature would be so full of these records that the subject would need no discussion at the present time, and instead of surgeons and gynecologists calling our attention to the likelihood of this condition developing, we would have actual record of probably the whole 200 to show that it is a danger. It would seem, therefore, that if only four or five cases are on record in which malignancy followed Roentgentherapy, we must acknowledge that we have either cured or prevented the development of 195 cases of malignant disease, or, in other words, we have reduced the 10 per cent to $\frac{1}{4}$ of 1 per cent. This then would be, instead of a condemnation of the treatment, the strongest argument in favor of it, for we must have either cured or prevented the malignant disease. It is entirely possible that there are many more cases which have developed malignancy but have not been placed on record. However, Roentgentherapy in this group of cases has been given, for the most part, in the large centers of population, and it is likely that any cases of malignancy would have been recorded in literature by the operating surgeon. It is also possible that not enough time has passed for the development of malignant disease in these cases, since Roentgen treatment has been discontinued.

It is my aim to deal with this subject fairly and honestly, and I think that surgeons should place on record any cases in which malignancy has developed after thorough Roentgentherapy, but in each instance the details should be sufficiently investigated and recorded to show that the treatment was properly given, for we all know that, just as many operations are done by incompetent men, so too Roentgentherapy is given by incompetent men, or with improper technic, and this fact should be weighed in the consideration of the likelihood of the development of malignancy in these cases of fibroid.

COMPLICATIONS ARISING DURING TREATMENT.

There is little reference in literature to the complications that arise during Roentgentherapy, but there is nothing to prevent an operation if a complication does arise during the course of treatment. Generally the patient's hemorrhage will have been controlled, she will be less anemic, and she will stand an operation better than before the Roentgentherapy. In one of the cases which I have treated, the patient had been extremely anemic from hemorrhage; the fibroid extended to the umbilicus; amenorrhea was produced and the tumor was reduced to the size of an orange, when she developed symptoms of pelvic abscess. This demanded an operation, which was done at a time when the patient was in much better health than before Roentgentherapy. There was no trouble in the healing of the wound, the preliminary X-ray treatment had done nothing but good, and she recovered completely.

In the case of a more recent patient referred to me by Dr. McGlinn, there were symptoms of pelvic abscess at the beginning of treatment. Dr. McGlinn considered resection inadvisable and treatment was begun. Within a week after the first series of doses were given the abscess showed signs of pointing in the vagina. This was incised and drained by Dr. McGlinn, which was a simple operation from which the patient made a good recovery, and she responded to the treatment of the fibroid in the usual way, making a permanent recovery lasting these three years. This patient could not be operated upon, according to Dr. McGlinn's judgment, at the beginning of treatment.

VISCERAL ADHESIONS.

The fear has been expressed that the visceral adhesions might form as the result of Roentgentherapy, which would make an operation difficult should such an operation become necessary later. Such effects upon the abdominal tissues have never been proven. In fact, the Roentgen rays are frequently used to cause the absorption of fibrous tissue, inflammatory exudate, or adhesions. This effect of the rays is being employed at the present time in the war zone to cause the absorption of the exudate and adhesions which have formed as a result of wounds or inflammations resulting from wounds. As evidence against the argument as to the formation of visceral adhesions, Case cites the following record: (7) A patient, age 62, was referred for treatment because of extensive carcinoma involving the prostate. In

ten months, nine series of X-ray treatments were given, crossfiring upon the diseased area. The malignant disease had involved the bowels, and a colostomy became necessary. These nine series amounted to approximately 6,000 X-units which were measured under filter. This was sufficient dosage and continued over a sufficient period of time to have produced adhesions, if this were likely, and is as much treatment as is likely to be given in any case of fibro-myoma. For instance, in group 3 of Gauss' collection, (3) which gave the best results and in which the most treatment was given, the dosage amounted to from 500 to 1500 X-units, which is less than one-fourth the amount of treatment that was given in this case reported by Dr. Chase. At the operation, at which colostomy was done, the appearance of the intestines was noted with great interest, to discover if possible adhesions as a result of the Roentgenization. The small bowel was entirely free from adhesions. The iliac colon was adherent near the ileo-pelvic junction, but in a manner very commonly seen at operation in patients who have never taken any Roentgen treatment. Just below the pelvirectal junction the bowel was found tightly adherent, the adhesions being confined to an area not larger than a pigeon's egg, accurately coinciding with the site of the carcinoma. Proctoscopic examination of the adherent area showed an annular constriction with some ulceration of the carcinoma which bled easily on being touched. A colostomy was performed in the usual manner. Dr. Case concludes, therefore, that there is no justification for the assumption that adhesions will form as a result of Roentgentherapy, which would make a subsequent operation more difficult.

Fraenkel (8) found in 75 per cent. of all cases where there had been adhesions of the genital organs, that they had improved or entirely disappeared after Roentgen treatment. Firmly fixed uteri become moveable, thick bands in the parametrium become softer and less prominent, and bands in Douglas' pouch could no longer be felt when placed under tension. In one case a firmly adherent ovarian cyst became moveable. He explains this retrogression of adhesions under Roentgen treatment as being partly mechanical, the myomata as they decrease in size losing the adhesions by traction. In other cases it must be admitted that there is a reduction of the adhesions by the direct action of the Roentgen rays. This was particularly true in adherent uteri and peritoneal

tuberculosis, and, in some cases, the retrogression of the adhesions was confirmed on laparotomy.

ADVANTAGES AND DISADVANTAGES OF THE TREATMENT.

The *advantages* are: 1st. It is painless; 2nd. It avoids the shock of an operation; 3rd. It preserves to a certain extent we believe the internal secretions, which are lost in a complete oöphorectomy; 4th. It does not interrupt the usual habits; 5th. Confinement in a hospital is avoided; 6th. In the hands of a skillful operator, it is without risk; 7th. The menopause is brought on gradually when necessary; 8th. The amount of treatment can be graded to the needs of the patient; 9th. In certain cases the rays can be confined to the tumor which involves the body of the uterus, and by protecting the ovaries sterility is avoided, and the patient is capable of bearing children, as is shown in a case reported by Dr. McGlinn and myself (9).

The disadvantages of the treatment are: 1st. The prolonged course of treatment that is usually necessary. This will usually vary from three to six months, but since the patient is only required to take the treatment for a few days at intervals of a month, this is not a hardship, especially since the patient at all times can go about her usual duties and take an interest in her usual affairs. 2nd. There is danger to the overlying tissues if the rays are not properly applied. By careful attention to the technic and exact measurement of the skin dose, this can be eliminated. 3rd. It is claimed to be more expensive than operation. In a sense this is true. However, if one considers that by this treatment the expense of board and hospital care is eliminated both in the case of charity and private patients, and in both instances they can go about their usual duties, I believe that we must conclude that it is not more expensive.

THEORY OF THE ACTION OF THE RAYS.

The results obtained in the treatment of uterine fibromata were originally supposed to be due entirely to the action upon the ovaries on the same principle by which castration would sometimes bring about relief, and on the same principle that the fibroids will disappear sometimes after the menopause. Undoubtedly part of the effect is due to the action of the rays upon the ovaries, reducing their irritability, and as a result the congestion of the uterus and the nutrition of the fibromata are decreas-

ed, but I believe that the greatest effect of the rays is upon the tumor itself. There is no reason why the action of the rays should not reduce this type of tumor just as it tends to reduce every other type of tumor. To prove that the action of the rays upon the tumor alone can cause the disappearance of the fibroma is shown in the case reported by Dr. McGlinn and myself (9). Briefly the case is as follows:

Mrs. E. C., age 24, primipara. At operation on May 19, 1915, a myoma the size of an orange was found growing from the posterior wall of the uterus, completely filling the hollow of the sacrum. The tumor was soft and apparently not encapsulated, and it was impossible to remove the tumor except by hysterectomy. The patient was pregnant. After consulting with the husband and parents, it was decided not to interfere with pregnancy and to deliver her, if she went to term by Cesarean section, if the tumor interfered with normal delivery. Fortunately she aborted, one week after the operation, an anacephalic monster. She made an uninterrupted recovery from the operation and the miscarriage, and left the hospital in three weeks. She was next seen by Dr. McGlinn, September 22, 1915. The uterus was anterior and well involuted. The tumor on the posterior wall was only slightly smaller than when last seen. A small fibroid nodule the size of a walnut was also found at the left uterine cornua. This growth was not noticed previously. Because of the anxiety of the patient to have children she refused hysterectomy. After consultation Dr. McGlinn and I decided to try to protect the ovaries and confine the Roentgentherapy entirely to the uterus. In brief, the tumor disappeared without cessation of the menses. The patient became pregnant, and was delivered of a normal child.

This case is instructive in many respects. In the *first* place it proves the possibility of treating uterine fibroids involving the body of the uterus without sacrificing the uterus, and thus avoiding sterility; 2nd, it proved that the rays can cause the complete disappearance of the tumor; and 3rd it proves that the action of the rays is chiefly upon the tumor, for it must be remembered that the menses were not affected during the entire treatment.

IDIOPATHIC HEMORRHAGE.

There is no group of cases in gynecology which yield such brilliant results from deep Roentgentherapy as the idiopathic hemorrhages. This is especially true with reference to the climacteric hemorrhages. In many cases, in which the hemorrhage has been continuous over a long period of time and in which repeated curettment has been done without permanent relief, a single course of Roentgentherapy produces a permanent amenorrhea. Even in young

subjects who have been curretted one or more times without stopping the excessive menstrual flow, or even an intermenstrual flow, a single course of deep Roentgentherapy may produce a temporary amenorrhea. In some instances, several courses or series of treatments are necessary to produce the desired results, but I am convinced that this class of patients are particularly sensitive to radiation, whether it be from the Roentgen rays or from radium. Therefore, when one is dealing with a young patient in the child-bearing period, who had been curretted one or more times without success, and is referred for deep Roentgentherapy, one should give only a moderate amount of treatment. I would say through only two or three portals of entry—unless the hemorrhage is so severe that life is endangered, in which case one must consider first the life rather than the sterility. An illustration of the latter type is that of a hemophiliac in which the hemorrhages have, on two recent occasions, almost exsanguinated the patient. Repeated currettment had accomplished nothing. In this instance, I believe we are justified in treating sufficiently to produce a permanent amenorrhea, and do it quickly. When the hemorrhages are not too severe, one can give small doses, or rather a small series, and repeat often enough to produce exactly the desired results; in other words, to cause a return to normal menstruation. Persistent bleeding after two or three courses of deep Roentgentherapy should lead to the strong suspicion of carcinoma.

UTERINE CARCINOMA.

Carcinoma of the uterus should be operated upon if the disease is discovered in the operable stage, and there are no contraindications to operation, but in every way of malignant disease the operation should be followed by deep Roentgentherapy. If the disease is too far advanced, if complications exist which prevent an operation, or if operation is refused, then the best chances are obtained by the combined use of radium internally and extensive Roentgentherapy externally. In the advanced cases one may expect amelioration; in earlier cases, possibly a cure.

Graff (10) has treated 102 carcinomata in all, 6 with mesothorium or mesothorium and radium, 73 exclusively with radium, 23 with radium and Roentgen rays. This combined treatment gave very good results. Of these cases 21 were clinically operable, 21 were recurrences, leaving 60 inoperable cases. From the clinical observations of the cases he concludes that with radium, and especially in combination with intensive Roentgen treatment, great improvement can be secured in operable cases, much more improvement than has ever before been obtained by any other method. Many inoperable cases have been rendered operable, and sometimes improved to such an extent that a diagnosis of carcinoma could not be made by examination, but there may be recurrence after such apparent recovery.

Wertheim's clinic still advocates using Radiotherapy only on inoperable carcinomata and on operable ones only when operation is, for some reason impossible, or is refused.

Greber (11) reports his experience in 100 cases of carcinoma, 84 of the uterus and 16 of the breast, treated with Roentgen and mesothorium rays. Of 59 inoperable cases of carcinoma of the uterus, some of them treated with mesothorium and some with the Roentgen rays, fourteen were cured, (that is, no carcinoma could be demonstrated clinically), fifteen died, five withdrew from treatment, five grew worse, and the remaining twenty were most of them markedly improved. Of 100 carcinoma patients, not less than thirty-two seemed to be cured at the time of report.

Flatau (12) advocates substituting radiotherapy for operation, even in operable cases of carcinoma of the uterus. Since December, 1913, he has not performed a radical operation for carcinoma of the cervix. After an experience of a year and a half he believes that beginning foci of cancer are entirely destroyed by radium or Roentgen treatment. He has never seen a case in which either radium or Roentgen rays had a stimulating effect on cancer growth, and does not believe that such effects are ever produced.

During the period mentioned he has had a

greater number of recoveries than he had with an equal number of cases during the same period of time when he was performing radical operations. His mortality with operative treatment was about 12 per cent. He thinks that even metastases in the glands may be destroyed by intensive irradiation of the whole contents of the pelvis with hard Roentgen rays. At any rate, radiotherapy should be given a chance to show what it can accomplish, which cannot be done if only inoperable cases are treated with it. The only final way of deciding between surgery and radiotherapy is to compare a large series of cases treated by the two methods after the lapse of many years, to exclude the possibility of recurrence.

In general I believe that we may expect improvement in carcinoma of the uterus in practically all cases, especially if the Roentgen rays are combined with the use of radium in the uterus or in the vagina. In some cases we may obtain complete disappearance of the symptoms, and in a few perhaps a cure.

POST-OPERATIVE TREATMENT OF CARCINOMA OF THE UTERUS.

Undoubtedly the greatest field of the Roentgen rays in gynecology is in this class of patients, and it is the field that has been less developed and less appreciated than any other. The laity, as well as the physicians in general, realize how likely the disease is to recur in cases of operation upon carcinoma of the uterus. Everyone who has been a close observer has noticed the effect of the Roentgen rays upon carcinoma, and the disappearance of primary lesions and of recurrences. This being true, it is quite rational to expect the disappearance of the small lesions that may be left behind after operation, and which lead to recurrences, providing the rays are used thoroughly after operation. This post-operative treatment should be given just as soon as the patient is able to go to the X-ray laboratory for treatment, and the treatment should be given with the same thoroughness as if one knew positively that malignant disease remained behind. Cross-firing should be used sufficiently to cover all

the areas likely to be involved by the disease. In a very early case, probably less treatment will be needed than in the advanced cases, but in advanced cases one cannot be too thorough. In these advanced cases, if this disease has already extended beyond the areas which one treats with the Roentgen rays, one must not expect recovery. I would like to make a plea for post-operative treatment, in the strongest terms possible, in every case of malignant disease.

DYSMENORRHEA AND CHLOROSIS.

Dysmenorrhoeic disturbances are frequently accompanying phenomena in young girls suffering from chlorosis. These disturbances which have been treated rather ineffectually with iron preparation, Fraenkel (13) states he has influenced rather successfully with X-rays. He has employed the stimulating rays to the ovaries in five cases and was able, by this alone, to raise the hemoglobin of these patients from 48 to 78 or 80 per cent., and in two cases even to 85 per cent. This offers a new field to X-ray therapeutics which the author believes will be of considerable value.

TECHNIC.

The technical object of the treatment is to get as much of the rays into the diseased area as is possible in the shortest period of time without damaging the overlying structures or causing any harm to the patient. Each *dose* of rays consists of the amount of treatment given through any portal of entry, whether this portal of entry involves the entire abdomen or only a very small portion of the abdomen. The *dose* is limited by the toleration of the skin, and the first and most serious effect of the rays are upon the skin, for no matter how much protection is used the skin receives the greatest amount of rays. As a rule, to give any particular *dose* of rays in deep therapy, I employ a Coolidge tube, excited by a transformer using five milliamperes of current, a nine inch parallel spark gap with a focal distance of eight inches, or its equivalent, for eight minutes using six millimeters of either aluminum or its equivalent of glass. If a stimulat-

ing dose is desired one should only use one-fourth this amount of rays.

Portals of Entry.—The deep effect is increased, generally, proportionate to the number of portals of entry or amount of crossfiring. One must limit this, however, because of the expense and because of constitutional effects. In the treatment of fibroids of the uterus, the number of portals of entry will depend in great part upon the size of the fibroid. A large fibroid requires more portals of entry than a small one. With a small fibroid or in cases of climacteric hemorrhage probably four to eight portals of entry will be sufficient, while with a large fibroid one can use twenty or more portals of entry to advantage. The duration of any course of treatment given in any month will depend upon the number of portals of entry and the general condition of the patient. We rarely give more than four doses on any single day, and usually allow at least one day's interval before adding more treatment. In some cases, especially the highly neurotic, it is inadvisable to even give four doses, and one must limit themselves to one or two doses. A course of treatment, therefore, will cover a period of from one to ten days. The interval between each course of treatment should be one month. The number of these courses of treatment will vary with the conditions treated, and in fact will vary with each individual case. Large fibroids require more treatment than small ones. Climacteric hemorrhage requires the least. Uterine carcinoma requires most, and in the case of uterine carcinoma one must give treatment at longer intervals, even after all evidence of diseases has disappeared, for it is well known that carcinoma cells may become encapsulated by the rays, and later break through their capsule and give rise to a recurrence, unless the treatment is followed up by further treatment. The skin is protected by the filtration, by pressure effects on the skin when this is practicable, and by the application of Dodd's lotion consisting of

Pulv. Zinc, Oxide, Dr.....	4
Glycerine, Fldr.	1
Phenolis, Min.	30
Aq. Calcis, (Fresh) Fl. oz. . .	8

CONCLUSIONS.

With reference to Roentgentherapy in gynecology, one is justified in drawing the following conclusions:

1st. Roentgentherapy is a useful adjunct in gynecology.

2nd. There should always be a close cooperation between the gynecologist and the Roentgenologist. In this way only suitable cases will be treated by Roentgentherapy, and Roentgentherapy will be used in all cases in which it is suitable. Complications can be dealt with when they arise, mistakes in diagnosis can, to a great extent, be avoided, and the actual value of the treatment can be definitely determined.

3rd. Roentgentherapy gives brilliant results in the obstinate cases of idiopathic hemorrhage, excellent results in suitable cases of uterine fibroid, and improvement and occasionally a cure in uterine carcinoma.

4th. Post-operative deep Roentgentherapy should be used in every case operated upon for malignant disease.

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TRANSACTIONS

OF THE

Clinical Society of the University of Michigan

Stated Meeting, April 3, 1918

The President, JAMES G. VAN ZWALUWENBURG, M.D., in the Chair

Reported by REUBEN PETERSON, M.D., Secretary

REPORT UPON THE CLINICAL SYMPTOMS AND ANATOMICAL FINDINGS IN THREE CASES OF ORGANIC BRAIN DISEASE SHOWING DISTURBANCES OF AN APHASIC AND AGNOSTIC TYPE.

ALBERT M. BARRETT, M.D.

(From the Psychopathic Hospital, Ann Arbor, Michigan.)

At a meeting of this Society in November, 1913, I presented a patient who showed an aphasic disorder of speech. This case was reported in detail in Volume V of the Transactions of the Clinical Society of the University of Michigan. Since that time the patient has died and we have had an opportunity of studying the pathologic condition that was responsible for the interesting disturbances of speech.

The essential facts of the symptomatology and course may be briefly recalled in this connection. The patient was a woman who, previous to an attack of apoplectic form character, at the age of 57, had been regarded as one somewhat above the average in intelligence, and whose health had usually been good. The apoplectic form attack was transitory in its effects and after a few days she seemed as well as ever. She performed her household duties acceptably until the spring of 1913. At that time there was a very notable impairment in her general efficiency and particularly there was a marked disturbance of her memory. She was abnormally irritable and occasionally made strange remarks that suggested delusions. Whatever difficulty may have been present in her speech at this time did not attract as much attention as did the general mental let-down and it was for this that she came into the Hospital. A summary of the large amount of

material obtained in the examinations of the disturbances of speech shows the following: On the receptive side of speech, she understood simple requests and commands but failed in whatever was complex or when several sentences were given in sequence. She would correctly pick out familiar objects that had been named to her. She recognized objects from their sounds and could name most objects that were shown to her. She could read the separate letters of the alphabet and could pick out her name, but was totally unable to read even short sentences. Recognition of objects by touch was unimpaired and a number of substances that were tasted were correctly identified. On the emissive side of speech, the disorder was most striking. There was little spontaneous speech. She would answer questions and occasionally volunteer a brief conversation. Sometimes she could read the alphabet correctly but more often she would stop before it was finished and make no effort to go further, seemingly forgetting what she was trying to do. Sometimes numerals would be intermingled among the letters. The same difficulty occurred in counting. Spelling of words of a few letters was often correct but with longer words she usually failed. Often the number of letters given was approximately right and sometimes the wrong letters had resemblance to those that should have been given. e. g. Tree was spelled t-r-o-o. Michigan, M-i-g. There was no paraphasia in spontaneous speech or in repeating from dictation. Perseveration was rather frequent, especially when she was fatigued. She was totally unable to write. She usually began a task as though she might be able to carry it through but her production had no resemblance to the letters desired. She seemed to have no understanding of gestures or, if she did understand them, she

could not transfer their meaning into the proper action.

There was a suggestion of an apraxic difficulty in executing commands. There was a marked delay as if she were puzzled how the action was to be done. When asked to point to her nose with her right hand she looked at her right hand, moved her arm apparently with some purpose and then placed her hand on her knee and made no further effort. Actions more complicated than this were rarely done correctly.

She understood the use of objects and, while there was usually some difficulty in using them, her actions with these were fairly correct. The main difficulties chiefly concerned the elaborative aspects of speech. In a large measure these were explainable by the profound memory disturbance that was present. There was a marked defect of intelligence. This was seen in her dullness, her loss of interest in the care of her person, and a considerable degree of emotional deterioration.

A summary of this speech impairment showed that there was preserved understanding of the simpler forms of language but impairment of anything that was at all complicated. There was a total alexia, or inability to read. Recognition of objects was preserved. There was no paraphasia. Repetition from dictation was impaired. There was some perseveration. Spontaneous speech was reduced in amount and there were gross errors in spelling.

Clinically, this type of speech disorder closely resembled what has been described as transcortical aphasia, a disturbance of speech in which the difficulty lies largely in the field of elaboration. Such a condition as this is more commonly observed in conditions of diffuse brain atrophy, especially where this involves regions concerned with the functions of speech or paths radiating to and from these. In rare instances, the same results might occur from focal lesions closely bordering the stations for the receptive of emissive functions of speech.

There were present during the clinical course of this case definite evidences of a diffuse disorder of the brain cortex. Such were the emotional dullness, the emotional impairment, and the general intellectual deterioration.

The patient was transferred early in 1914 to the State Hospital at Kalamazoo. The examinations at that institution noted the same disorder that had been found in the hospital at Ann Arbor. Deterioration advanced grad-

ually until she became helpless on account of her general mental weakness. Without any definite apoplectic insult she developed an inability to use the right leg in walking. Her deterioration reached a most extreme degree. She finally became unable to stand alone. While in bed the legs were flexed and her head held stiffly. Gordon's and Oppenheim's reflexes were present in both feet. The pupils were irregular and sluggish in their reaction. There was slight internal strabismus of the left eye. Towards the last the muscles of the body would twitch whenever she moved. Death occurred in February of 1916 from broncho-pneumonia. The entire duration of the disease was about three years.

The examination of the brain showed it to be strikingly small. Its weight was 1130 grams. There was a fairly large cyst of an old internal hemorrhagic pachymeningitis covering the convexity of both hemispheres. Part of the contents of the cyst was from a rather recent hemorrhage.

The hardened brain showed the effects of a lateral compression from the cyst. The convolutions in general were very small, and in the parietal and frontal regions were somewhat flattened. The speech areas did not show more marked gross changes than other regions.

Microscopic examination showed extreme atrophy of the convolutions and the presence of numerous miliary plaques such as are characteristic of senile brain atrophy. The nerve cells showed severe degeneration. Many were sclerotic and generally they were overloaded with fatty pigments. Many nerve cells showed degenerations of the neurofibrils. These were thickened and formed whorls and tangles of the type rather frequently found in connection with the formation of plaques.

The age at which the process occurred, namely 57, as well as the prominence of the changes among the neurofibrils, show that this case was one of the premature forms of senile brain atrophy, known as Alzheimer's Disease. The speech disturbance thus finds its explanation in a diffuse rather than a focal lesion, a finding that is usual for most cases of transcortical aphasia.

A CASE OF TACTILE AGNOSIA.

The case is that of a man, R. H., S. P. H., No. 2238. At the age of two he had a severe fall and fractured both shoulder blades. He was not unconscious at the time. He was backward in mental growth, not talking until the age of six. About this time, he entered school but his progress was slow. At the age of nine, he was placed in the

state school for the feeble-minded but after a brief time was taken home and again placed in the public schools. At the age of twelve, he had only reached the third grade. As it was supposed that his backwardness was due to some head disorder, at the age of twelve, a trephine operation was made in the left parietal region. He appeared brighter after this but did not return to school. At fifteen, he started to work in a factory. He continued to work successfully, receiving good wages, until he was twenty-seven. He then began to complain of a tight feeling in his head. He grew more dull and at times there were periods of unconsciousness. There were also periods of confusion in which he would wander away and there was amnesia for all that happened during that time. A second operation was performed in June of 1916. In this a large button of bone was removed from the upper part of the left parietal region. Three days after the operation, there developed a paralysis of the right hand and face. Mention was made by his friends of his inability to speak correctly at this time. The paralysis of the hand and the speech disturbance passed off after a week but there developed attacks of Jacksonian epilepsy. For about a year, these occurred about once each week. During these attacks, the right side of the body and the right arm and the face were contracted and jerked violently.

There was usually some mental disturbance associated with these attacks. Recently, the attacks have been more severe and in many of these he bit his tongue and was definitely unconscious.

He entered the Psychopathic Hospital in February of 1918, at the age of 30. Here, he was dull and disinterested in his surroundings. He gave a fair account of his past experiences and description of his attacks. He was usually irritable and complained much of various somatic discomforts.

The neurologic examination showed a circular defect in the bone of the right and left parietal regions, marking the place of the two previous operations. There was a marked dysarthria in the spontaneous speech and with test phrases. There was slight atrophy of the muscles of the right lower arm, the circumference of this arm being about one inch less than the left. The left grip measured 34 on the dynamometer, the right 12. He complained of the right hand being cold and the skin of the hand was shiny and the volume of the muscles was less than on the left side. There was no disturbance of sensibility of the left arm or hand. In the right hand, he appreciated light touch, pain and position sensations, but these reactions were far less keen than in the left hand. At times, following mild degrees of unclarity, all qualities of sensation seemed to be absent in this hand but when mentally clear these reactions were present to a considerable degree. At no time was there any ability to name or identify objects placed in the right hand. When a knife was placed in this hand, he would usually remark that he did not feel anything. Similarly, he failed to name or identify keys, a watch, pencil, or pen. Whenever these objects were placed in the left hand, they were correctly recognized and correctly named.

On one day he complained of peculiar feelings

of numbness that passed every few minutes along a narrow strip up his back and out over the shoulder up to the defect in his head. At times there were involuntary contractions of the muscles of the right hand and often he spoke of this arm and hand being numb. There was slight spasticity of the right leg. Both knee jerks were increased and Babinski's reflex was present in the right foot.

These various disturbances were present during the entire period of observation. On the 10th he had a severe convulsion. This began without warning. The head was slowly drawn to the right and the right angle of the mouth was drawn downward. The fingers of the right hand were clenched and this arm was slowly flexed and moved across the body. After a brief period of fixation in this attitude, rapid clonic movements spread over the entire body. These were followed by relaxation and a period of stupor lasting about fifteen minutes. Two days later he had five convulsions. On the day following there were sixteen convulsions and on the next day convulsions followed one another at very brief intervals. During this last three days, he was continuously unclear. Death occurred during a convulsion.

A partial autopsy was held shortly after death, the head alone being examined. The scalp was firmly adherent about the edges of the defect in each parietal bone. In the right parietal region, there was a circular defect in the bone, about 3 cm. in diameter. This had been closed in by a dense membrane. The dura mater in the region of both defects was firmly adherent to the bone and beneath the defect on the left side it was densely adherent with the underlying brain substance. The brain tissue was soft and flabby and flattened under its own weight. The veins were slightly filled. There was no arteriosclerosis.

After fixation, a more detailed examination of the brain was made. The brain substance lying beneath the defect in the left parietal bone was torn and firmly adherent to pieces of the dura mater. The limits of the area affected were rather difficult to sharply outline by reason of the softened character of the tissues. It lay within the lower half of the posterior central convolution, involving the extent of about three-quarters of an inch of the convolution. The anterior central convolution was not involved and it could be easily separated away from the dura and then showed no defect.

Of particular interest in this case was the lack of ability of the man to recognize and identify objects that were placed in his right hand in spite of the preservation of the perceptions of touch, pain and muscle sense. Such a disorder has been designated astereognosis. This condition has always been one of much interest from the standpoint of localization and interpretation of the psychic features that were involved in the process. The disorder is essentially an inability to form a correct concept of the object, even though the elementary sense qualities, such as touch, muscle sense and pain, furnish information. It, therefore, is a disorder of association, a disturbance of the synthesis of elementary sense qualities into a concept. An interesting question is whether the disorder is one of associations between the differ-

ent sensory elements themselves or between these elements as a whole and areas of the cortex in which are stored memories of other sense perceptions, such as visual, auditory or possibly other special sensations, the inter-relation of all of these being essential for the awakening of the idea of the object. Such a disorder would be produced by a lesion cutting off the central convolutions from the occipital or temporal areas of the brain.

On this point, our case furnished no conclusive information. The localization of a lesion to produce disorders of this type always lies back of the central fissure. This lies either in the posterior central convolution in the middle third or in the parietal region where it may cut across association paths between the receptive areas for the sensations of touch, pain and temperature and the region concerned in visual impressions. In the case under discussion, the lesion involved the cortex and closely adjacent white substance of the lower part of the middle third of the left posterior central convolution.

It did not seriously disturb the anterior central convolution. It did not seem deep enough to cut across the deeper association paths with the visual areas and its effects seem rather to be among the areas of primary sense perception. However, it does not definitely prove this.

The close proximity of the lesion of the head area at the lower end of the central convolution may explain the involvement of the head and face, symptoms which were present during the early part of the course, and may also explain the aphasic difficulty that was noticed for a brief period.

A CASE OF MOTOR APHASIA.

The case is that of a woman of average intelligence, who could read and write. At the age of sixty, she had a sudden attack of faintness. A few days later she had difficulty in talking. She could not recall the word she wished and in her speech many words were used incorrectly. Although she recognized members of her family, she could not speak their names. This difficulty with speech increased, until her speech was limited to replies of "yes" or "no" and a few familiar words. During this time she was somewhat more dull than formerly, but she was able to do her housework acceptably.

She was admitted to the State Psychopathic Hospital in November, 1917. The physical and neurologic examinations showed slight enlargement of the heart to the left. The blood pressure was 140. The gait was unsteady, and she swayed in Romberg's position. There was slight asymmetry of the face. The pupils were irregular in outline but the light reactions were not impaired. In both feet there was a slight dorsal flexion of the great toes. There were no paralysis or sensory disorders.

There was no spontaneous speech. She understood all that was said to her, but her replies were limited to a few words, always spoken with difficulty and in low tones. She gave her age and her name, but to most questions there was no response at all, or sometimes she would repeat the question. When asked if she knew the correct answer, she nodded affirmatively. Efforts to have

her read were without success. She would take the copy, look at it and make no response.

While usually mildly stuporous, she would rouse during examinations and show a fair interest in what was being done. This stupor increased rapidly until, one week after admission, she became unable to feed herself and was too feeble to stand. There was no longer any spontaneous speech, but her reactions all showed correct understanding.

Neurologic symptoms became more marked. The right arm became paralyzed. A well marked Babinski reflex was present in the left foot but not on the right. On several occasions she vomited. The Wassermann reaction was negative on the blood. Unfortunately, there was no examination of the fundus.

Her stupor deepened and death occurred nineteen days after admission.

The autopsy showed evidences of increased intracranial pressure and the left hemisphere was more voluminous than the right.

After fixation, section of the brain showed a tumor mass occupying the subcortical white area and much of the overlying cortex of the anterior two-thirds of the Island of Reil. Anteriorly the area reached into the posterior part of the left third frontal convolution. It very definitely infiltrated into the subcortical parts of Broca's area. Its internal border extended along the outer margin of the claustrum. Externally, it infiltrated the pia of the Island, and had a small extension into the tip of the first temporal convolution. The posterior part of the first temporal convolution as well as its connections with the Island were not involved.

The tumor was found to be a glioma. It was of an infiltrating character and in several places there were cysts filled with products of disintegration.

In summarizing the disturbance of speech, it is found that this entirely concerned the emissive functions. These were not entirely abolished but were very severely impaired. Understanding of spoken language was preserved. Her ability to read was abolished. Clinically, it corresponds very closely to the motor types of aphasia.

DISCUSSION.

DR. MAX PEET: I recently had one case which showed beautiful asteriognosis. This was a boy whom Dr. Darling had about two years ago with a tumor on the left side pretty close to the median line in the post central gyrus. At the first operation this was diagnosed as sarcoma. At the second operation it was diagnosed endothelioma. His asteriognosis did not clear up after the first operation. Another case recently showed one of the other symptoms which Dr. Barrett has mentioned, a case of injury to Broca's area. This was a boy with endothelioma which grew down from the dura, but had not invaded the cortex at any point. This was purely a question of injury to the motor speech center from pressure without. This boy did not have the complete motor speech loss. If you asked him how old he was he would start counting, one, two, three, four, five, six, six, six, eight, ten eleven, and could not go beyond that. If you helped him out and said twelve he would say yes, but could

not go beyond. If you said nineteen, twenty-two, etc., he would shake his head. When the number twenty was mentioned he would say yes, as this was his age. At times he could count farther than at other times. This was before we removed the tumor. His hearing was perfectly good, he understood every word you spoke to him showing that the posterior part of the speech area was intact. And his associations were all right. His only trouble lay in his inability to go beyond a certain line. On the other hand, he could say expressions which he had been in the habit of saying for a long time. He could say, "O dear." Very often he said this when something bothered him. Some of these patients cannot say a word but they can swear beautifully. Then we had another case which illustrated an injury to all three of these areas. The man had paralysis on the opposite side also. He could see perfectly well. There was a question whether he could hear but he could not say a word or understand a word, and yet could understand any motions. He had some optic atrophy and we had difficulty in telling whether he had visual aphasia. We submitted to him a newspaper with enormous headlines, "Kaiser asks for peace." I knew any individual who would get the visual meaning of that would show some interest. He showed none. These particular cases of Dr. Barrett it seems to me, are especially interesting because they bring out so clearly the possibilities we have in brain localizations, and the aphasias and asteriognosis are very important in cerebral surgery, giving us very definite information as to the location of many tumors. Fortunately many of my cases have been cases in which the tumors have been on the surface, although most of the cases are gliomas below the surface. Decompressions would prevent loss of sight and relieve pressure, but would not relieve the symptoms, but rather make them worse if the function was not entirely lost.

I am rather at a loss to say why any simple operation such as the one described by Dr. Barrett should leave asteriognosis or any other marked lesion in the brain cortex. If the dura is opened and brought together again we do not expect trouble from adhesions. On the other hand, when we do a decompression and remove the bone the adhesions between the brain cortex and overlying muscle very seldom give paralysis or loss of sensation below it.

DR. THEOPHIL KLINGMANN: I would like to call attention to the fact that these cases are of unusual interest because they are clear-cut, both clinically and anatomically, and for that reason are of great help in correlating the symptom complex with the anatomical changes. These cases are very satisfactory and for that reason are very encouraging in this line of work. The tendency to correlate mental symptoms with anatomical lesions has met with some success and appears more hopeful as far as solving many of the clinical manifestations on an anatomical basis.

DR. L. H. NEWBURGH: I would like to ask Dr. Barrett if there is usually some other lesion in this precocious senile dementia i. e. if there is any renal or cardiac disease and general atrophy? I ask this because every now and then there are

cases of precocious arteriosclerosis described that primarily involve the heart and kidneys. I was wondering whether there is any connection between such cases and the case described here. Might it be the same process?

DR. BARRETT: As a rule, the arteriosclerosis process occurs at an earlier period than the process of senile brain atrophy. As a rule, arteriosclerosis of the brain is associated with focal lesions such as well defined softenings or atrophies. In this case, we have a process entirely different. It is not certain as yet what the factors are in producing these peculiar plaques. In the greater part of these cases, there is a marked fatty degeneration of the cell and very commonly an increase of the glia groundwork structure of the cortex. It is possible that the plaque has its beginnings in the accumulations of products from cell disintegration in the meshes of the glia fiber. Very often, there is at the same time an arteriosclerotic disease of the brain but the process of plaque formation and that of the arteriosclerosis are quite distinct. There was little evidence of arteriosclerosis in this case. The blood pressure was 140 and at the autopsy there were no marked findings of arteriosclerosis.

DR. VAN ZWALUWENBERG: Is there an hereditary tendency in senile dementia?

DR. BARRETT: We have very little definite information on this point. Undoubtedly, there is a tendency in some families for brain atrophy to occur more frequently than in others. There seems to be a considerable amount of evidence that arteriosclerosis runs in families. One very common finding among patients suffering from arteriosclerotic brain disease a history of cardiac and vascular disorders among the ancestors.

REPORT OF A CASE OF TRANSVERSE MYELITIS FROM A BULLET WOUND.

CHARLES L. WASHBURNE, M.D.

(From the Surgical Clinic, University Hospital, Ann Arbor, Michigan.)

CASE No. 10278, male, age 21, German-American. Entered the hospital, February 28, 1918.

Chief Complaint.—Paralysis of left leg.

Family History.—Father living at fifty-five and well. Mother living and well, age forty-eight. Four brothers and six sisters living and well. No history of tuberculosis, heart disease, nephritis, cancer or insanity in the family. No hemophilia.

Personal History.—Measles, chickenpox, mumps. No other diseases. Neisser and lues denied. Smokes and chews in moderation. No history of previous injuries.

Marital History.—Was married at eighteen. One daughter living and well. No history of miscarriages. Wife died of pneumonia one year ago.

Present Illness.—Began December 4th, 1916. The patient's brother was showing him a new gun which he had purchased, at that time having been recently appointed to the police force. The gun was supposedly empty at the time, and the brother was about to snap it shut when it discharged, the bullet entering the abdomen at a point some four or five finger breadths above the umbilicus and three finger breadths to the left of the median line. The

bullet did not come out posteriorly. The patient immediately became stiff and was laid upon the floor to await the arrival of the police patrol which took him to the hospital. The accident took place at 6:30 in the evening. An exploratory operation was done two hours later. The liver was found to be grazed but there was no puncture of the intestines. The bullet was not removed, the patient being told that it would give him no further trouble as it was probably lodged between the eleventh and twelfth ribs near the spinal column. The patient was paralyzed from the waist down at the time of the accident but, after five weeks in the hospital, he regained complete control of the right leg. The left leg has remained almost completely paralyzed, with slight improvement. There is still sense perception in the left leg and sensation is more acute than during the first few weeks following injury. The patient remained in the hospital for nine weeks. A dull aching pain, which the patient says began at the point of entrance of the bullet, has been slowly going down the leg and is now located at the ankle. The patient's left foot feels cold to the touch. The ankle is slightly less movable than on the right. During the early period of his injury, the patient had no control of the sphincters. At the present time he has poor control of the bowel and is unable to hold urine longer than two hours. He was catheterized twice daily while in the hospital. He sleeps well during the day but is kept awake much during the night by pain in the left leg.

Physical Examination.—Pupils are central, equal and regular. The left reacts to light more readily than the right. No nystagmus, extraocular movements normal. No enlargement of the cervical glands. Respiratory movement free and equal, liver dullness about normal, no rales. Heart rate, 90. Percussion normal. There is a large scar some eight inches in length extending from a point four or five finger breadths above the umbilicus and two or three finger breadths to the left of the median line to a point on the level with the umbilicus. The incision was made through the bullet wound which is in the center of this scar. Abdomen otherwise negative. Knee jerks not obtainable. The legs are thin and show muscle atrophy of disuse. The left leg shows no muscle action.

X-ray Examination.—Reveals a bullet in neighborhood of the second lumbar vertebra. Stereo plates of this region demonstrate this foreign body opposite the second lumbar disc, apparently in the neural canal, anterior to the cord. The outlines of the centra both above and below are smooth. The posterior arches are intact. There is no evidence of injury to the bony structures to indicate the tract of the projectile. Evidently this bullet has entered from the side or through the fibro cartilage. A Wassermann taken of the blood, was negative. Blood pressure, systolic 110 m. m. hemoglobin 100 per cent. reds, 5,000,000; whites, 8,600.

March 4, 1918, operated under ether anesthetic in the Orthopedic Service. An incision was made extending from the twelfth dorsal to the third lumbar spinous processes. The muscles were carefully separated from the spinous processes and

laminae. Hemorrhage was checked by packing the wound with adrenalin gauze. The interspinous ligament was cut at the third lumbar, the spines cut with a bone forcep and turned upward. The laminae were resected and the cord coverings exposed for a distance of about two inches. The meninges between the first and second lumbar bodies were thickened. A hard substance could be felt on a level with the second lumbar vertebra deeply embedded in the posterior wall of the cord covering. Further dissection showed this hard substance to be a very much distorted lead bullet. A portion of the bullet was intimately associated with the nerve fibers of the cord from which it was removed with some difficulty. A free flow of spinal fluid followed the removal and the cord was seen to pulsate normally. No area of cord degeneration could be demonstrated. The dura was closed with No. 00 chromic catgut. The muscles and interspinous ligament were sutured with No. 2 chromic catgut, continuous sutures. Skin sutures were of silk worm gut. A small rubber tissue drain was inserted for serum drainage. Sterile dressings were applied and patient returned to bed in good condition.

Post Operative Record.—Patient reacted well from the anesthetic. Two hours temperature; 100, pulse 128, of good quality, respiration 28. For first 24 hours the foot of bed was kept elevated. For five days following operation the patient complained continually of a severe headache which was only slightly relieved by ice caps and large doses of aspirin. The morning following operation, patient had not voided and complained of pain over bladder; thirty ounces of urine were removed by catheter. The drain was removed at the end of 48 hours and the wound showed no leakage of fluid. On the sixth day the patient began to void urine normally without any dribbling. During the first week there were several involuntary bowel movements but none thereafter. There was a daily p. m. temperature of 100 to 102 for first six days. The temperature reached normal on the seventh day and remained so. Stitches were removed on the twelfth day at which time the wound was healing satisfactorily. During the third week there was severe pain in the left leg which disappeared in a few days. At present he has perfect control of the sphincters. He has been up in a wheel chair for five days and on crutches for the past three days.

Physical Examination: April 2, 1918. Left upper thigh shows three inches atrophy. No atrophy of calf. Tapping on left patellar tendon causes pain, no reflex contraction obtained. Right patellar reflex shows very slight action. No ankle clonus or Babinski on right. No ankle clonus on left. Plantar irritation gives no response whatever. Left foot and leg covered with a profuse perspiration. Patient is unable to move left lower limb. No muscle action above knee. Slight action in muscles controlling foot. The left foot assumes a position of equinus deformity. There is anesthesia to pin point along the internal surface of the left foot. No other area of cutaneous anesthesia, although sensation is much diminished over whole the left lower extremity. Incision of back well healed

showing only a few remaining crusts. Pressure sore over sacrum and left buttock nearly healed.

DISCUSSION.

DR. MAX PEET: I think Dr. Washburne is to be congratulated upon getting this bullet out without doing any more damage to the cord than had been done by the original trauma. Bullets are especially difficult to remove on account of the deformity which catches onto the adhesions, the various nerve roots and the cord itself. Personally I believe all such cases should be operated upon as soon as possible, but often a year afterwards perhaps some improvement, or complete cure can be hoped for. There are in many cases a pure paralysis due to pressure. In such cases removal of pressure will give relief. One of the great advantages of early operation comes from the relief of the tension in the cord. Experimental work has shown that, where a definite trauma would always produce a lesion from which an animal would completely recover, a slightly greater trauma would produce a lesion which would always give permanent paralysis. But when the cord was incised in the latter cases the animal would recover complete motor and sensory function. So in these early cases, the earlier the operation the better. If the cord is swollen, bluish, and non-pulsating, simple incision into the cord will often give relief. The fact that this man has not as yet recovered use of the one leg is no sign that he is not going to. Six months is the average time for improvement, and some cases show improvement for two years. I think Dr. Washburne can look for still more improvement in this case.

DR. JAMES G. VANZALUWENBURG: I showed the lantern slide reproduction of this man's radiograph at a previous meeting of this society, and I commented that I could not conceive a bullet of such size getting into the spinal canal without producing damage to the bony wall. The only way I could conceive is that it must have dodged in from the side, being deflected in the abdomen and passing in between the laminae or pedicles, and if it did, it is curious that it did not injure some of the spinal roots.

DR. WASHBURNE: This man had his bullet for fifteen months before he came here. He had entirely healed up and didn't know that he had a bullet. Now he thinks it is there. What are your indications? What would you want if you knew you had a bullet in such a place and were paralyzed? Would you want to leave it there? It might do no good, to operate, but you would never be satisfied until it was out. As a matter of fact, this bullet did not lie against the cord, but below the lower end of the cord. It evidently came in from the side, following the lamina. One portion lay right on the fibers from the cord and was in contact with the anterior wall of the spinal canal. The root fibers of the cord lay right on top of it. When the bullet was removed the spinal fluid came out after it. The main part of the bullet lay anterior to the axis of the canal.

ETIOLOGY AND TREATMENT OF DYSTOCIA OF CERVICAL ORIGIN WITH A REPORT OF FOUR CASES.

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Dystocia as a result of a rigid cervix is a well known although relatively infrequent, obstetrical condition. To a mild degree, however, it is present in nearly all primiparous labors, but here it is physiologic and does not ordinarily require treatment. This paper is confined then to those cases in which there is a marked delay in the dilatation of the cervix.

The distinction of functional and organic rigidity is convenient but open to criticism because there probably is no true functional rigidity. In all of the cases of cervical dystocia reported here there is an organic element.

Inasmuch as the internal os is usually partly dilated before the onset of labor, the difficulty is met with the external os. Here, according to Galabin & Blacker (1), there are strong circular muscle fibers which may contract tightly and give rise to serious trouble. This is especially likely to occur in nervous women in cases of reflex irritation where there are frequent examinations or premature attempts at delivery. Fieux, quoted by DeLee (2), denies the existence of circular muscle fibers in the cervix uteri at term and ascribes all these cases to anatomic causes. While this may be so, nevertheless there are numerous cases recorded in the literature in which the cervix remained tightly contracted despite hard pains, in the absence of any known etiology.

In premature rupture of the membrane the elastic dilating wedge of the bag of waters is lost and we may get spasm resulting in poor dilatation. The cervix may become swollen and edematous and in extreme cases may even slough off. In old primiparae the rigidity is probably anatomic rather than spastic. Here the elastic tissue has been more or less replaced by fibrous tissue which dilates with difficulty.

The treatment of functional rigidity of the cervix is bound up with the treatment of organic rigidity because it is difficult and even impossible in some cases to determine which factor is more important. Whenever there is difficulty in the first stage a careful vaginal examination is indicated in order to determine the cause of dystocia. In the spastic type of rigid cervix pressure of the finger tip against the os, especially during a pain, may serve to relax the spasm and allow dilatation to pro-

ceed normally. If not, the finger may be inserted inside the os to separate any adhesions which may exist between the membranes and cervix. If this is unavailing we may administer chloral by mouth 15-30 grains which may be repeated if necessary. Morphine $\frac{1}{6}$ - $\frac{1}{4}$ of a grain by hypodermic often is efficacious in relaxing the spasm. Whether these drugs act by relaxing the spasm or not, there is abundant clinical evidence to mark them as valuable drugs in the management of a tedious first stage. Atropine alone in doses of 1/100 grain or combined with morphine (3) has been recommended in this condition. Hot vaginal douches, Sitz baths, the application of cocaine to the cervix and the injection of glycerine (4) into the os have also been recommended. Our present tendency, however, it is to avoid soiling the vagina unless operative interference is indicated. If these measures are not sufficient to secure dilatation there is undoubtedly an organic basis for the dystocia and we will proceed as will be presently described under the treatment of that condition.

Organic rigidity of the cervix may be due to a variety of causes. Of the congenital malformations, complete atresia is incompatible with conception and hence needs no discussion here. Longitudinal septa in the canal from failure of complete fusion of the Mullerian ducts are not very common but may seriously obstruct labor. Congenital hypertrophy of the vaginal portion of the cervix is rather rare and usually these patients do not become pregnant. Its effect upon labor is the same as the acquired form of hypertrophy which is more common. This usually comes on during pregnancy when it grows quite rapidly. T. C. Smith (5) reports such a case in which the long thickened cervix did not dilate well. He finally applied forceps and was able to extract the child using his instruments as dilators.

Inflammatory processes about the cervix may act in two ways in bringing about dystocia. In the first place we may have a chronic endocervicitis with a fibroid deposit or we may have adhesions formed between the membranes and the lower segment of the uterus. In this condition the external os may be practically obliterated by an inspissated plug of mucus. This produces a condition known as *conglutio orificii externi*. The adhesions counteract the dilating tendency of the uterine contractions and we often get premature rupture of the membranes. This gives us an added factor in producing delay. The cervix becomes thinned but

does not dilate. We can almost always locate it by speculum as a small depressed area. Simple pressure against the external os may overcome the resistance after which dilatation goes on rapidly.

Malposition of the cervix may interfere with the normal progress of the first stage. Usually the os is deep in the posterior fornix with the anterior fornix obliterated although occasionally the reverse is the case. The etiology of anterior displacement of the cervix is usually sacculation of the anterior uterine wall due to pregnancy in a retroverted uterus. Sacculation of the posterior wall of the uterus in a case of anteversion will displace the cervix backward. This is especially prone to occur when pregnancy follows such operations as anterior fixation or interposition operations for prolapse. The treatment of this condition depends on the individual case. Occasionally expectancy is rewarded by spontaneous dilatation. If not the finger may be hooked in the external os and an attempt made to pull it forward or backward, as the case may be, into its proper position.

Syphilis has been described by Tarnier as producing rigidity of the cervix in a variety of forms, namely, the induration of the primary sore, hypertrophic mucous patches such as occur during pregnancy, gummata, tertiary ulcers and finally a diffuse sclerosis comparable to syphilitic stricture of the rectum. The majority of writers on this subject have tacitly accepted syphilis as a cause of cervical rigidity. However chancre of the cervix and secondary lesions are the only authentic syphilides which have been found in this locality and they leave no residuum. Tarnier and others who have reported these cases made their observations before the discovery of the Wassermann test and the spirochete and consequently their conclusions cannot be given serious consideration. Dr. Wile, in a careful review of the subject, finds no authentic case of tertiary syphilis of the cervix. Syphilis of the internal genitalia of the female is practically unrecognized and its role as an etiologic factor in dystocia cannot be estimated until we know exactly what lesions it produces. Undoubtedly it affects the pelvic organs including the cervix but the older methods of diagnosis have failed to reveal it so it remains for the demonstration of the spirochete to establish the true status of syphilis in obstetrics and gynecology.

New growths of the cervix, notably polypi and carcinoma, may obstruct labor. Both of

these conditions however are usually associated with sterility. Their effect upon labor and the treatment is not within the scope of this paper and will not be considered here.

We have finally cicatricial stenosis of the cervix and it is chiefly with this type of obstruction that I wish to deal. We may have scars in the cervix as the result of old lacerations, following cauterization or as a sequence to operations such as trachelorrhaphy or amputation.

The healing of old lacerations may result in the deposit of scar tissue which at a subsequent labor will not dilate under the influence of uterine contraction. Such a case is reported by Lusk (6). The patient was first seen after having been in labor for a considerable length of time. She had had one child before but there had been no operations. Examination showed that the cervix was undilated and the uterus tetanic with a well marked contraction ring. Before she could be prepared for Cæsarian the uterus ruptured and the woman died.

Strong cauterizing medicines and even the actual cautery were used many years ago for such gynecologic conditions as erosions, eversion, and ulcerations of the cervix and consequently dystocia occasionally resulted from the scar tissue. But the cervical cautery is no longer used except in the management of cancer and as a result this cause of prolongation of the first stage is no longer seen.

The effect of trachelorrhaphy upon subsequent labor is a subject which has been considerably dealt with. The consensus of opinion is that the operation properly performed will have little obstructive effect upon the character of the next labor. There are, however, several instances reported in the literature in which there was considerable dystocia and one of the cases reported here comes under this classification. Probably in these cases, as has been suggested by Mitchell (8), there has been too much cervical mucosa removed in the repair resulting in a small os. Theoretically, simple repair of the lacerated cervix should not produce dystocia. The scar which results is linear and if this has been properly covered with mucous membrane the amount of undilatable fibrous tissue will be reduced to a minimum. Leonard (9) reports ten cases of pregnancy following trachelorrhaphy only two of which had difficult labors. He quotes fifty-one additional cases collected from the literature in only six of which was dystocia encountered and rightly concluded that the operation properly performed has little in-

fluence on the cause of subsequent childbirth.

Amputation of the cervix as a cause of dystocia has been fairly extensively studied by the French but the American literature shows only one valuable contribution on this subject. Leonard reviewed the literature in 1913 and added eleven cases from the Johns Hopkins clinic. In seven of these labor was very difficult and he concludes that the operation should be avoided during the child bearing age if possible. Doleris (10), in reporting seventy-eight cases operated by himself, claims that with perfect technic the scar tissue will be reduced to a minimum and dystocia will not result. Although this may be true to a certain extent we can hardly call the technic of the Hopkins' clinic to account for the large percentage of cases of dystocia following their method of amputation.

The difficulty in dilating such an os is readily understood. The scar from an amputation is circular surrounding the os and, when it contracts as all scars do as they grow older, its tendency is to still further diminish the caliber of the canal. Normally the force of the contractions of the uterus are exerted at the point of least resistance which is the internal os. At this point only is there an absence of external pressure. This action is further enhanced by the tendency of the uterus to draw up into the fundus the fibers of the cervix. Added to this we have the hydrostatic action of the bag of waters. But the smaller the diameter of the opening the less purchase the uterus and the advancing part have upon it and if this is further reinforced by a circular band of scar tissue, severe dystocia is almost inevitable.

Amputation of the cervix has another influence which has been especially emphasized by Audebert (11) & Leonard. There is a marked tendency to abortion and premature labor. Of thirty-two pregnancies reported by the latter, 17 or 55 per cent. terminated prematurely, consequently in considering the management of these cases we must bear this possibility in mind. Both amputation and trachelorrhaphy apparently predispose the patient to sterility. This, as has been pointed out by Johnson (12), is more apparent than real because so many of the patients when operated are reaching the age when pregnancy is unlikely. Leonard has shown that the tendency to sterility is more common after amputation than after trachelorrhaphy, because stenosis is

more likely to occur when the resulting scar is circular.

The course of labor in cicatricial stenosis depends upon the amount of scar tissue present. In some cases the external os will remain small for a considerable length of time but finally the scar tissue gives way and the cervix dilates rapidly. Occasionally, as in a case reported by McPherson (13), the cervix may tear at the side and if operative interference is delayed delivery may occur through such a tear. If the os is very resistant it may present at the vulva still undilated. Rupture of the uterus and death from shock, hemorrhage or peritonitis will occur if the stenosis cannot be overcome. In some cases the cervix may become markedly edematous due to interference with the blood supply and after a time it may slough off. Hemorrhage from this complication may be serious and even fatal. Sepsis is a real danger partly because of the bruised edematous tissue and also because interference is usually necessary in these cases.

The chief danger to the child is asphyxia. This is especially marked when the membranes rupture prematurely because, in that event, the hydrostatic cushion of the bag of water has been lost. If operative interference is instituted, we have the added danger of forceps injuries. Provided there are no complications present, the prognosis is uniformly good if the patient is seen early in labor and the proper measures are taken to safeguard both mother and child. If the first stage is unduly prolonged or if ill advised operative procedures are attempted, the outlook is not good.

In the treatment of cicatricial stenosis of the cervix we should bear in mind that although intelligent expectancy may be followed by spontaneous dilatation, yet many babies have been lost and mothers exhausted by fruitless attempts to overcome the obstruction. It is true that there is little danger to the child during the first stage of labor if the membranes are unruptured but in the prolonged first stage of dystocia of cervical origin we must keep careful track of the condition of the child and be ready to interfere at any time in its interest.

Should interference be necessary we have our choice of manual or instrumental dilatation, multiple incision, vaginal hysterotomy and abdominal Cesarean section, either the classical operation or the Porro modification. The procedure will depend upon the condition of the case. Manual dilatation is often very difficult, due to the scar tissue in the cervix. Instru-

mental dilatation is a questionable procedure in any case because of the difficulty in gaging the amount of force used. Multiple incisions of the cervix are of great value in those cases where the internal os is completely dilated and the external os is undilated. In such a case incisions from $1\frac{1}{2}$ to 2 cm. in length will cut only the supravaginal portion of the cervix and not endanger the bladder or the rectum. The anterior and posterior incisions will be practically bloodless but the lateral ones will give rise to hemorrhage in some cases. This can be controlled by pressure of the advancing part until the child is born after which sutures are applied, or the incisions may be made between clamps which are removed after several minutes. If this is done there is rarely very much hemorrhage. Mason (14) speaks highly of this method and reports several successful cases.

Vaginal hysterotomy may be used if the child is not too large. It is especially valuable where the cervix is not completely taken up. However, it is very hard to do when the cervix is far back and cannot be pulled down. Cesarean section has been used when conditions contraindicate vaginal delivery. If the classical operation is done it is essential to see that the cervix is open sufficiently to ensure proper drainage of the lochia. LePage (15) has reported a case in which the Porro Cesarean was performed in order to obviate this difficulty. It may also be done in order to prevent the possibility of future pregnancies, or in case the uterus has been infected by attempts at delivery from below.

The following cases have been selected from the Gynecologic and Obstetric records in order to illustrate some of the above points.

Case 1. Mrs. G., a Greek housewife of 26, (Obstetrics No. 1328) was examined at the fifth month of her first pregnancy. Her history and examination were entirely negative. The cervix was long and the external os small. When eight and a half months advanced her membranes ruptured prematurely and pains began three hours later. Examination showed the fetus to be in occiput left anterior and the child in good condition. Under the influence of moderate pains the cervix dilated to the size of a quarter in about six hours. After this she began to have a constant bloody discharge but examination revealed no other sign of placenta praevia or premature separation. After twelve hours of hard pains the cervix was found on rectal examination to be thick and swollen and about one-half dilated. The patient was anesthetized and mid forceps applied. The cervix was pushed back over the advancing head and the child extracted. It was in pallid asphyxia and was resuscitated with some

difficulty. The anterior lip of the cervix sloughed off subsequently but the mother otherwise made an uneventful recovery. The etiology of this case of dystocia probably was premature rupture of the membranes resulting in cervical spasm. There may also have been an endocervitis with adhesions between the cervix and membranes. The long continued pressure of the head upon the undilated os resulted in interference with the circulation and edema.

Case 2. Mrs. B., (Obstetrics No. 1465) entered the Hospital in labor, October 13, 1916. She had four children living and well and there had been numerous miscarriages. Seven years previously she was operated on for laceration of the cervix. Five years ago she had a miscarriage early in pregnancy. At the time of entrance she had been having very hard pains for ten hours and because the doctor could find no evidence of cervical dilatation he brought her to the Hospital. Vaginal examination revealed the cervix to be obliterated and very thin. The external os was about the size of a dime. After this the cervix dilated rapidly and within two hours the child was born without interference. The rigid cervix in this case was due to a previous trachelorrhaphy. Its rapid dilatation was the result of the giving way of the old scar tissue because examination at the tenth day revealed a bilateral laceration which was quite deep on the left side.

Case 3. Mrs. E. W. Housewife. Married. Was operated in June, 1911, for cystocele and rectocele. The Watkins interposition operation was performed, the cervix being repaired and the perineum built up. She was not sterilized. Three years later she entered the Hospital pregnant, about at term. She had been having severe hemorrhages for three weeks. Examination revealed the presence of a complete placenta praevia with the cervix pushed far back in the hollow of the sacrum. It was so far back that even with a normally implanted placenta the uterine contraction would have been unable to dilate it. Realizing the impossibility of a vaginal delivery an abdominal Caesarian was done and the uterus removed with the product of conception. This case also teaches us that whenever the interposition operation is done in the child bearing age the patient should be sterilized.

Case 4. Mrs. L., aged 35 (Obstetrics No. 1700), entered the Hospital during the sixth month of her pregnancy. She has four children living and well, the youngest being ten years of age. She was operated in 1912 for lacerations of the cervix, at which time an amputation was done. She has always had menstrual difficulty but following her operation this has prolonged. Severe cramp-like pains begin before the period and last until the flow has ceased. The present pregnancy began in June, 1917. In the latter part of October she began to notice a protrusion from the vulva, which increased in size until it was as large as an orange. This interfered with walking and became markedly irritated. She could not urinate until she replaced the mass. Examination showed the presence of a six months pregnancy complicated by prolapse. The bladder came down outside of the vulva and the vagina was completely inverted so that the fornices were only a centimeter inside of the vulva. The

cervix could not be found at first but careful inspection revealed a tiny os which just admitted the finest probe. It was identified by a small amount of stringy mucus which was present. It had been amputated and the stump covered by vaginal mucous membrane thus accounting for the difficulty in locating it. The prolapse could easily be replaced but recurred as soon as she stood on her feet. It could not be held in place by a pessary because of the extensive perineal laceration. She went into labor a week before the expected date of confinement; her pains beginning at six p. m. of March 17th. At first they were ten to fifteen minutes apart but by midnight they were coming at four minute intervals, lasting about forty seconds. She was put upon her feet and the cervix pushed outside of the vulva. It was found that there had been no attempt at dilatation. When the prolapse was replaced, if she remained in bed, there was no tendency toward recurrence even during a pain. She continued in labor throughout the night, the pains becoming harder but no more frequent. At ten a. m. she was examined by Dr. Peterson who found that there had been no change in the cervix. Inasmuch as sixteen hours of reasonably hard pains had produced no effect upon the cervix, it was decided to interfere. The patient was anesthetized, and a probe inserted into the cervical canal. It was just large enough to admit a uterine sound. This was followed by a small hemostat and dilated until the metal dilator could be introduced. This was replaced by the thumb and forefinger as soon as possible. Dilatation was continued, normally until the thumb and three fingers could be introduced. At this time it was found that the internal os also was incompletely dilated. Manual dilatation was unusually difficult owing to the scar tissue so the bladder was dissected up off the uterus and the anterior lip was split in the midline for a distance of about ten centimeters. The child was then delivered by version and extraction. It was a female weighing six pounds two ounces and was only slightly asphyxiated. The placenta was then expressed and the incision repaired. The patient has made an uneventful recovery, her highest temperature being 101.6 degrees on the third day.

The choice of interference in this case is worthy of explanation. In the first place, the question of the abdominal route presented itself. This was rejected for the following reasons: 1. The cervix and vagina had been prolapsed outside of the vulva for six months and undoubtedly were badly contaminated by pathogenic organisms. 2. The external os could be found only with the greatest difficulty by direct inspection. Had an abdominal Caesarian been done it would have been necessary in order to secure drainage to dilate the cervix, which would have been even more difficult to find from above. This difficulty could have been obviated by the Porro Caesarian but this would interfere with subsequent operative procedure to cure the prolapse. 3. The adhesions following Caesarian, the possibility of which could

not be removed, would seriously interfere with a subsequent attempt to cure the prolapse by the interposition operation. For these reasons, then, the vaginal route was chosen.

Manual dilatation was first attempted but was rejected after trial because of the scar tissue about the os. Multiple incisions were rejected because the internal os was likewise not completely dilated and according to Dührsen their use is not applicable in such a case because of the proximity of the bladder and rectum. Consequently vaginal hysterotomy was performed. There is only one disadvantage which can be found with the operation in this case. There will undoubtedly be scar tissue along the attachment of the bladder to the uterus. Whether this will interfere with the interposition operation remains for the future to decide. This patient will return for the correcting of her prolapse sometime after the process of involution is complete.

There is one other point which deserves mention in connection with the last case and that is the occurrence of procedentia complicating pregnancy. In these cases there is a great tendency to abortion but if pregnancy continues the prolapse usually retracts itself spontaneously. The development of the condition during pregnancy, however, such as occurred in this case, is very rare and the fact is noteworthy that she spent most of her time after the fourth month with a mass the size of a large orange outside of the vulva without interfering with the pregnancy.

The treatment of cystocele during labor is also brought up in this condition. If the patient lies down there will be no interference with the bladder during the first stage. It should be emptied frequently and we must caution her against bearing down. As the head descends after dilatation of the cervix the cystocele may be tucked back out of the way.

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DISCUSSION.

DR. CYREMUS G. DARLING: There are one or two points in this paper which might be discussed, and one is the question in regard to the formation of cicatricial tissue following cervical repair or amputation. I suspect that the statistics that have been gathered in this paper belong to a past age in gynecology, as no one doing operations of this type nowadays, would expect his operation to be followed by marked cicatricial tissue, hence these reports as to the cause of dystocia would hardly stand with present methods of operating. The methods which may be pursued to overcome these various contractions are properly mentioned and most of them can be followed by most any one who practices obstetrics even in a general way. Occasionally there will be a case such as the last one described which will require a more difficult and careful operation. Fortunately these conditions are rarely found, at least, I take it to be so. I never encountered one in five or six hundred confinements.

There is one point which might be raised, and that is in regard to amputation or repair of the cervix causing sterility, or rather, causing miscarriage. I think that is hardly true if the operation is carefully performed; in fact, it is very frequently performed to overcome this very condition, and if sterility occurs it would be because of the imperfect operation, or perhaps infection following such.

DR. HENDERSON: Trachelorrhaphy especially is an operation done for the cure of sterility. Occasionally a very marked bilateral laceration of the cervix may be the cause of repeated abortion. The repair will probably result in the carrying of future pregnancies to full term. Amputation of the cervix, however, would never be done for this purpose. The operation of amputation of the cervix is not always properly done and many of these cases become infected and in these cases there is always excess of scar tissue. These cases will occasionally be met with by the obstetrician.

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Editorials

ADIEU.

With this issue we are bidding our members and readers adieu. The war activities of the past year and its inherent effect upon the profession of Michigan caused the officials of our Society to impress upon us that our duty was at home, and that the responsibility of certain work rested upon us. Acting upon that advice we endeavored to acquit ourself of that duty. The degree in which we succeeded is left to our members to determine. We at all times purposed to meet the exigencies that arose and strove to respond to the uttermost to promptly and efficiently complete each problem. We do not purpose to enumerate them in detail; he who is not conversant with their nature can scarcely realize their portent and relation to our profession. The Society has met and fulfilled every demand that was made upon it. We also believe that our organizational affairs are in such condition as will cause all future requirements to be met in like manner. Our house may be said to be well in order.

The work accomplished, the fundamental

principles of war activity outlined, business policies determined and the demand existing for more medical officers for our military forces we felt that the restraint that had been placed upon us could now be severed. For the fourth time we requested the Council for "Leave of absence." It was granted on the 16th of June. We applied for a commission, which was conferred and in due course orders were received to report for duty on July 18th, 1918. We are writing this on the eve of our departure.

In bidding adieu we desire to address just a word to you who are intrusted with the duty and responsibility of "Keeping the Home Fires Burning." This is *your* Society and *your* Journal. Upon *you* rests the work of maintaining its efficiency and influence to the fullest degree and to direct the work that properly comes within its province. Our Society is and must remain the head and fountain of medical life and activity in Michigan. You individually and our members collectively must recognize that fact and be governed accordingly. There must not be and never should be tolerated individual, factional or unaffiliated semi-official movements in this state in medical matters. No single group or coterie of individuals, even though alleged to be acting under governmental policy, should be recognized in our war work. All such administrative bodies or "Councils" should and by right ought to emanate from official appointment by our State Medical Society. We must not countenance the stepping in of politicians and schemers who would usurp our vested rights and powers. Our Society must be and remain the head of all medical activity in the state and from it all other subservient movements or work should emanate. There never was and never should be a single reason for independent movements or activities. Governmental officials, those in real authority, have repeatedly stated that it is their belief and experience that co-operative assistance to our military forces can best be rendered through the channels of organized effort—the National, State and County Societies. If error has been made in creating such bodies let that error be now corrected, but let us draw into closer

relationship and become more firmly united. We plead for organizational compactness, unity and efficiency. We deplore all attempts toward the opposite or the existence of spasmodic efforts of independent groups. If you hold membership in or are affiliated with any such outside movement Council, or Committee we urge that you at once resign and subscribe your allegiance and work to your own Society which is undertaking and will meet all necessary war demands. You can serve but one master, recognize but one head—*your State Medical Society*. Be loyal to it at all times.

Your County Society and its officers must receive your support. The thinned ranks must not be permitted to waver. By accepting double duty you must keep its purpose and work maintained. Your meetings must not be postponed or abandoned. The few remaining should attend each meeting religiously and regularly and even though the number present may be small do not recognize discouragement. The boys who have gone are with you in spirit and you should feel their presence and carry on the work until they return. Do not let them return home to find that you failed to keep their local Society intact or that you permitted it to become disorganized. We plead that you remain true to the trust that has been imposed in you. Now, if ever, be more than loyal to your local society.

We believe that the administration of the State office of Secretary and the editing of the *Journal* will be continued in an efficient and satisfactory manner under the arrangements that have been made. At times occasion for tolerance may arise and those conducting the work will merit kindly consideration. Errors made will be cheerfully and promptly corrected when attention is drawn to them. Please remember that new problems constantly arise as the result of changing commercial conditions and that it is not always easy to arrive at a prompt or satisfactory solution. For illustration: We are now compelled to rearrange our mailing lists and method of mailing to comply with new Postal Zone Regulations. We must also submit and certify to intricate reports on percentages and rates of advertising,

reading matter, "fillers," etc., of each issue and indicate the number of copies going into each zone before *The Journal* will be accepted in the post office and distributed by the U. S. mail. This must be done for each issue. Similar problems arise each month on varied subjects. Therefore we solicit your patience while these requirements are being met and bespeak your cooperation.

Finally as a last adieu. Even though we feel and clearly see our duty, compliance is not an easy proposition. To relinquish the professional, industrial, civic and social relationships that have resulted from sixteen years of strenuous effort and to turn our bark upon a new course and out upon a new and unknown sea realistically brings upon us an avalanche of conflicting emotions. We meditate upon the past and speculate as to the future. We have sought to do our duty and to acquit ourselves of the trust that was imposed. We extend our sincerest thanks for your confidences and express a hearty appreciation for the honors bestowed. The memory of our official relationship will ever be cherished. As we depart, ready to devote our all to help "Carry On" till this war is won our last word to you, member and reader, is: We wish you health, success and contentment. We bid you adieu till we meet again.

ANNOUNCEMENT.

The Medical Profession, of Michigan, has as a whole responded loyally to the call of our country, and its full quota of physicians for army service has been filled by volunteers. A further call has been made however, and doubtless these will continue to come during the period of the war.

While we are expected to fully supply the needs of our Army and Navy for medical men, we are also instructed by the Government that the home service of medical men, domestic and industrial, must be fully provided for. This will require a system of careful selection and assignment for service of physicians in the State of Michigan, if we are to do intelligently

and consistently our full part in "winning the war."

To this end all agencies heretofore engaged in securing physicians for service will be consolidated. Committees of each County Society will have in hand the collection of data and the selection of physicians for Army and Navy service as well as for home service.

This will provide for a fair and equitable distribution of service as between communities in counties, and should equalization as between counties become necessary, means will be provided therefore.

A War Committee consisting of Drs. F. C. Warnshuis, C. G. Jennings and J. G. Turner was appointed by President Biddle and this committee has performed considerable preliminary work. Dr. F. C. Warnshuis, Chairman of the Committee, is now called to the army medical service, and I have appointed to take his place on the committee, Dr. Reuben Peterson, Ex-President and well known to practically every physician in Michigan.

In behalf of the Michigan State Medical Society, and in order that the good name of the medical profession of Michigan may be maintained, I am asking that not only every county medical society, but that every loyal physician (and I can not believe there are any other in Michigan) give to our War Committee their most loyal support and helpful co-operation in carrying along intelligent and effective effort.

Let us show that the Doctors of Michigan are all red blooded Americans with no yellow streaks.

ARTHUR M. HUME, President.

To the Members of the Society and Readers of the Journal:

The administration of affairs of the Secretary's office and the editorship of *The Journal*, heretofore so admirably and successfully conducted by Dr. Frederick C. Warnshuis, has terminated. Our Secretary-Editor requested that the Council grant him indefinite leave of absence and this has been done. Dr. Warnshuis has responded to the call of his country and the call of his heart and has entered the Medical Service of the Army.

The Chairman of the Council, Chairman of the Publication Committee, Treasurer and President met with the Secretary-Editor in Grand Rapids, July 5. It was there arranged that, working in co-operation with the experienced office force remaining, the affairs of the Journal and of the Secretary's office will be carried forward by these officers of our State Society.

We appreciate our lack of experience in these lines of work but we are loyal and devoted to the interests of our State Society and our Country. We invite your suggestions, even your criticisms. We ask your patience and forbearance with our shortcomings, but most of all we ask your assistance and co-operation in making the work of the medical profession of Michigan a large factor in that great cause that now most appeals to the heart and the head of every loyal American—THE WINNING OF THE WAR.

ARTHUR M. HUME, President.

Editorial Comments

We understand that the Ford Hospital in Detroit was closed July 1st and will pass into the Governmental service and be re-opened on August 1st under the direction of the Surgeon-General. At present writing we are uninformed as to what class of patients it will be utilized for by that office.

We once more appeal to our readers to patronize our advertisers. Please realize that now more than ever the *Journal* is made possible by reason of our advertising receipts. Unless these advertisers receive suitable returns upon their investment they are going to withdraw their patronage. Your support is imperative to maintain this income for your *Journal*.

Years hence in reviewing the response that Michigan's profession made to the call for assistance by the Surgeon-General we will have every reason to be proud of the record that will be revealed. However, to maintain our position

at the front of state activities of sister states it becomes imperative that certain communities now review their record and if it is found that they have not responded in the degree that they should immediate steps should be taken to rectify their record. The need of the service demands that more men must be forthcoming now from certain parts of the state.

In so far as is possible and regulations permit your editor will endeavor to contribute to these editorial pages. We hope to be able to send copy for each issue but are not fully informed as to the degree of freedom that will be permitted in commenting on or describing military medical practices and experiences. With these comments we are concluding temporarily sixty-eight "batches" of editorial comment. The writing of that amount of copy has been the most difficult part of our editorial duties. We have always sought to make these comments to the point and to deal only with pertinent and timely matters of interest to our members. We trust that the effort expended has been of interest to our readers.

Excellent reports are being made of the use of a two per cent solution of formalin in glycerine in infected wounds and suppurating cavities. We would appreciate a report of cases with detailed results from the use of this formula. Try it and let us have your personal experience.

The Editor's text-book "The Principles of Nursing Technic" published by W. B. Saunders Co. has been adopted by the Navy Medical Department as the standard for its training station's courses of instruction. We believe our members will pardon this personal announcement in this column.

We are wondering how long it will be before that group of "Professional organizers" referred to by President Bevan of the A.M.A., will attempt the organization of a Medical Officers' Veteran Association. It occurs that possibly they can already find a sufficiently large group of charter members.

Seriously if such an organization becomes desirable at the close of the war it should be affiliated with or be a section of the American Medical Association, with state units.

Yes it was a small issue—the July number. The combination of A.M.A. meeting, revision of mailing list to comply with new postal regulations, State Board meetings and scarcity of news items and County Society news all contributed to making the issue a small one. Incidentally it cost less and so enables us to retrieve on total expenses because the two previous issues were expensive editions.

Please continue to send us your news items. Also your Society news and meeting reports. Your members on duty receive *The Journal* and are eager to learn of organizational activities and "doings" at home. Please Mr. Secretary send these reports and items.

The Editor, Dr. F. C. Warnshuis, is assigned to the Surgical Division of a Base Unit, for early Overseas Service. He reported for duty at Camp Sherman, Chillicothe, Ohio.

The response by the profession of Michigan is splendid. Please read carefully and thoughtfully President Hume's editorial in this issue. We again urge that all our members at home become active in their Society work at home and assume in every detail the responsibility that rests upon them.

Lt. Col. V. C. Vaughan—"Our Vaughan"—who has been on duty in the Surgeon General's office in Washington since war was eagerly greeted by many of our members during the Chicago meeting of the A.M.A. Col. Vaughan has indeed proved himself a sincere friend to many of our members who have entered the service. His advice and assistance in the work at Washington has been invaluable and he has endeared himself in the hearts of many. The profession of Michigan is proud of his service.

Dr. A. P. Biddle has been elected President of the Detroit Board of Education. The election is a pleasing one, more so because it insures the future of the Detroit College of Medicine and Surgery which is now under the management of this Board. We extend congratulations.

Just a hint to those entering the service about the purchasing of uniforms and outfit. Considerable money will be saved if you make a

trip to Camp Custer and purchase your equipment from the Quartermaster and at the Depot Brigade exchange. Splendid uniforms can be secured for \$35.00. Blankets, shirts, bedroll, locker, hats and caps can be purchased with 15 to 40 per cent. saving over what you pay a tailor or civilian stores. It is worth the trip. Another suggestion is to not to purchase only what is necessary for your reporting outfit. Buy the balance when you get in camp where you will have time to learn what you will need and according to your own particular tastes and wishes.

War Committees of County Societies will please read President Hume's editorial. Remember we are working under orders from Washington transmitted through the War Committee of the A. M. A. As orders and instructions are received they will be transmitted to you and in the meantime endeavor to have the men in your community who are eligible for a commission and can be spared file their application with the Surgeon-General.

"The Laboratory That Knows How."

The Cutter Laboratory of Berkeley, Calif., has for twenty years been serving the physicians of the country; but in order to better meet the requirements of the profession, they have re-organized and enlarged their Chicago office, and are better prepared than ever before to serve the interests of our readers. Accordingly this Journal has accepted their page announcement and is printing that announcement in this issue. If you find their service available for your practice, we bespeak for the Cutter Laboratory a share of your patronage.

We are informed that our State Board of Health is becoming crippled in its work by the exigencies of War. Some of its laboratory men, several local health officers and many physicians of the state heretofore doing or supporting the public health work, have gone into War service.

The physicians of Michigan have always been and we believe always will be the leaders and in fact the main support of all public health work. While the state has provided for the official direction of its public health service, the actual conservation of the public health has been carried along by the medical profession.

In its time of need our State Board of Health is appealing to the medical profession to assume individual responsibility in this conservation work during the period of the war, and its appeals must be heeded not only collectively but individually. Not a new but a greater responsibility has come to

each one of us, and just to the extent that we assume a discharge that responsibility will be loyal to our countries service.

It is quite probable that some form of organized work will laid out along these lines. At this time we are simply sounding "first call" so that every loyal physician in the state may be polishing up his equipment ready to take his place in the line of duty as a volunteer in the army for the conservation of man power.

Deaths

Lieut. Wm. L. Miller, M. R. C., U. S. Army, Saginaw, Michigan, graduate of the University of Oregon, 1915, registered pharmacist fellow of American Medical Association, was killed in France, May 28, 1918.

Dr. Miller was in the service of his country with Ambulance Company No. 128, Sanitary Train No. 107, Thirty-Second Division, American E. F. in France.

He was but a youth of 28 years when death covered him with glory and made his name one that will live in the profession of Michigan for all time to come. His was the rare honor that can come to none other of being first in the medical profession of Michigan to make the supreme sacrifice.

We can express our feelings in no better way than to cite the stanzas of the now immortal McCrae, who died as Miller died in the service of the flag.

Oh guns, fall silent 'till the dead men hear
Above their heads the legions pressing
on.

(These fought their fight in time of bitter
fear

And died not knowing how the day had
gone.)

Oh flashing muzzles, pause, and let them
see

The coming dawn that speaks the day
afar;

Then let your mighty chorus witness be
To them, and Caesar that we still make
war.

Tell them, oh guns, that we have heard
their call,

That we have sworn, and will not turn
aside,

That we will onward 'till we win or fall,
That we will keep the faith for which
they died.

Dr. Earl Bigham for twenty-five years a practicing physician in Grand Rapids died on July 5, after a brief illness following diabetes.

State News Notes

Clinical Congress of the American College of Surgeons. In announcing the plans for this year's meeting to be held in New York the week of October 21st, the invitation is first extended to Fellows of the College, so that if you are interested to attend I would urge you to send in your registration at once, as following the plan of previous sessions, attention will be limited to a number that can be readily accommodated at the clinics without overcrowding. After thirty days, if the limit of attendance has not been reached by advance registration on the part of Fellows, invitations will be extended to a selected list of men whose names have been approved by the State Credential Committees.

A war session is planned—with distinguished officers of the English, French and Italian Armies, together with American medical officers, participating in the evening programs to discuss the important phases of surgery in the field and in evacuation and reconstruction hospitals. Acceptances of places on the program have been received from some of the best known European surgeons.

A strong committee of New York and Brooklyn clinicians, under the leadership of Dr. J. Bentley Squier, Chairman of the General Committee, and Dr. George D. Stewart, Chairman of the Executive Committee, are preparing a program of clinics and demonstrations in leading hospitals and medical schools that will provide a complete showing of the city's clinical activities in all departments of surgery and in allied branches of medicine. Into these plans the surgeons of New York and Brooklyn have entered enthusiastically, expecting to furnish a week of clinical demonstrations surpassing in scientific value and interest any previous effort.

In closing let me remind you again of the necessity of sending in your registration at once to insure receiving a membership card, for when the limit of attendance has been reached no further registrations will be accepted.

Of the twenty graduates of the Detroit College of Medicine and Surgery this June, sixteen will enter the army or navy.

This is the fiftieth class to graduate from the institution and the last that will receive diplomas from the old board of trustees.

The college passes under control of the Detroit

board of Education July 1. A dean will be secured from out of town and he will name the new faculty.

Sixty-five members of the graduation class of the University Medical School have received internships. The large percentage entering hospital work is in accordance with the request of the Government that medical graduates fit themselves for army service by taking a year's internship.

By enrolling in the University Medical school immediately after June 15 and applying for commission in the medical reserve corps, pre-medical students will establish their status as medical students and will be excused from active service during their course of study.

Dr. Margaret Cobb, who has formerly done research work at the University of Michigan, is one of two women psychologists to be appointed to the army medical department.

The British medical mission consisting of Sir. Jas. McKenzie, Col. Sir Wm. Arbuthnot Lane, and Col. Sir Albert Alexander Borace was entertained in Detroit June 21.

Dr. J. L. Burkhart, ex-Secretary of the State Board of Health is now located in Big Rapids. Dr. Burkhart is occupying Dr. Dodger's office and continuing his practice.

Dr. Ricker of Cadillac, was ordered to report for duty on July 14, at Camp Gordon, Atlanta, Georgia.

Dr. Guy L. Connor, of Detroit, is spending his vacation at the "Soo."

The State Board of Registration in Medicine held a special two day session at Charlevoix, July 20-21st.

Barium Sulphate-Brady for Roentgen-Ray Work.—A brand complying with the N. N. R. standards for barium sulphate for Roentgen-ray work. Geo. W. Brady & Co., Chicago. (*Jour. A.M.A.*, June 1, 1918, p. 1599).

Acid. Phenylcinch.—Morgenstern.—A brand of phenylcinchoninic acid, U. S. P. It is sold as Tablets Acid. Phenylcinch.—Morgenstern containing 0.5 gm. acid. phenylcinch., and as Sodium Phenylcinch.—Water—Morgenstern, a solution of sodium phenylcinchoninate containing sodium bicarbonate and sugar and representing the equivalent of - gm. acid. phenylcinch.—Morgenstern per fluid-ounce.

COUNTY SOCIETY NEWS

It is the Editor's desire to have this department of the Journal contain the report of every meeting that is held by a Local Society. County Secretaries are urged to send in these reports promptly

INGHAM COUNTY

A regular meeting of the Ingham County Medical Society was held at the home of Dr. and Mrs. C. V. Russell, Lansing, on May 10th.

Together with routine business communications from the State Secretary were read to the meeting of the war needs and dearth of medical officers. There was discussion but no action.

It was enacted to pass suitable resolutions of congratulation to Mayor Roy Vandercook for services in the State Constabulary. The President appointed Drs. E. I. Carr, F. N. Turner, and F. M. Huntley to draft these resolutions.

Dr. William K. West, Copper Range Mine & Railroad Surgeon of the Upper Peninsula, was the guest and speaker of the evening. He read a valued paper on "Fractures and their Management" and interspersed it with instances from his large and long experience. In discussing fractures of the lower extremities, he brought to attention, quite in detail, the use of the Hodgkin splint. He pointed out the principles of Traction and Suspension which are incorporated in the Hodgkin idea.

A social time followed.

A regular meeting of the Ingham County Medical Society was held at the Chamber of Commerce, Lansing, on May 28th.

It was announced that the Patriotic Committee, composed of Drs. W. E. McNamara, L. C. Towne, A. M. Campbell, Karl Brucker, and B. M. Davey, should act as the War Committee, and that this Committee had been announced to the State Secretary.

Doctor Henry J. Vandenberg of Grand Rapids, gave an address on the Cancer program, illustrated with lantern slides and pathological specimens. He took up plant cancer in introduction and called attention to evolution, analogies, etc. of the present status of conceptions. His discussion of Metastasis varying with different types was valuable.

E. I. CARR, Secretary.

Book Reviews

DISEASES OF THE MALE URETHRA. By Irvin S. Koll, M.D., Professor of Genito-Urinary Diseases, Post-Graduate Medical School and Hospital, Chicago. Octavo of 151 pages, with 123 illustrations, several in colors. Philadelphia and London: W. B. Saunders Company, 1918. Cloth, \$3.00 net. W. B. Saunders Company, Philadelphia and London.

Although more and more interest is continuing

to be awakened in venereal diseases, the need for such a monograph as this will be felt much more in the period of reconstruction than at present. The education that every soldier gets on the prevalence of gonorrhea and the necessity for immediate and skillful treatment will inevitably result in a wide-spread demand upon the profession for the latest and best methods. The exposition of the subject by Koll should, therefore be met with great enthusiasm by the general profession.

The first three chapters are largely introductory. Recent advances in the bacteriology of gonorrhea are given full discussion. The value of the microscopic, complement fixation test, and vaccine therapy is taken up in detail.

The next four chapters deal with acute and chronic gonorrhea and its complications. The pathology is clearly illustrated by many beautiful colored plates. Operations of external urethrotomy, drainage of prostrate, etc., are very explicitly described and illustrated.

There are four chapters on non-gonorrheal diseases of the urethra.

The conciseness and simplicity of the text and the purely personal viewpoint of the writer make the book very pleasant reading.

Miscellany

Anti-Pneumococcic Serum, Type I, Cutter.—Marketed in vials containing 50 Cc. Cutter Laboratory, Berkeley, Calif.

Antipneumococcic Serum, Type I, P. D. & Co.—Marketed in a piston syringe containing 50 Cc. Parke, Davis & Co., Detroit, Mich.

Antipneumococcic Serum, Type I, Squibb.—Marketed in vials containing 50 Cc. E. R. Squibb & Sons, New York.

Mead Johnson & Co.: Mead's Dextri-Maltose, No. 2; Mead's Dextri-Maltose, No. 3.

Procaine-Recoor.—A brand of procaine complying with the N. N. R. standards. Procaine is the substance which was first introduced as "novocaine." The Rector Chemical Co., Inc., New York.